

**SAMPLING TRIP REPORT**  
**FOR SOIL SAMPLING NEAR SOLUTIA, INC.**  
**SAUGET, ILLINOIS**

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U.S. Environmental Protection Agency  
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## 1.0 INTRODUCTION

Under the Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Enforcement, Permitting, and Assistance (REPA5) Contract, Task Order R5533, Booz Allen Hamilton (Booz Allen) has been tasked to conduct surface soil sampling near the Solutia, Inc. (Solutia) W.G. Krummrich facility in Sauget, Illinois. The overall project objective is to further characterize polychlorinated biphenyl (PCB) contamination in soil on public parcels in the City of East St. Louis located near the Solutia facility. The additional data collected will be used to characterize the extent of contamination and contribute to a human health risk evaluation for off-site exposures. Photographs of the field and sampling activities are included in Attachment A. Log books documenting field activities are located in Attachment B. All sampling activities performed under this Task Order were conducted as described in the REPA5 Quality Assurance Project Plan (QAPP) dated October 31, 2012, and site-specific Sampling and Analysis Plan (SAP) dated March 18, 2015, unless noted in Section 3.5 of this report.

Table 1 provides a complete list of personnel present during the sampling event, along with their affiliations.

**Table 1: Participants in Field Investigation**

Name	Affiliation
Mary Lemier	Booz Allen Hamilton
Meredith Watson	Terranext

## 2.0 PROJECT DESCRIPTION

### 2.1 Site Description, History and Background

The Solutia site is located in Sauget, St. Clair County, Illinois and has operated at 500 Monsanto Avenue for nearly 100 years. Solutia has manufactured various organic chemicals derived from benzene, including PCBs. The Solutia W.G. Krummrich Plant was formerly operated by Monsanto, which spun off its chemical business in 1997. It is located just east of the Mississippi River along Illinois Route 3 in the American Bottom floodplain region.

EPA issued a RCRA 3008(h) Administrative Order on Consent (AOC) on May 3, 2000. On February 26, 2008, EPA issued a Final Decision to remediate soil and groundwater contamination. The \$22 million remedy focuses on removing source areas of PCBs, benzene, chlorobenzenes, lead, and mercury that is potentially impacting workers, contaminating groundwater, and migrating to the Mississippi River.

In 2004, Solutia completed an interim remedy to contain, intercept, and collect contaminated groundwater that was discharging and causing environmental impacts to the Mississippi River. A groundwater migration control system was installed at the river's edge consisting of a slurry barrier wall keyed into bedrock and groundwater collection wells. Collected groundwater is treated at the American Bottom publicly owned treatment works.

In 2009, EPA collected soil samples from 30 residences and two parks located in Sauget and East St. Louis, Illinois, near the former PCB manufacturing area of the facility. A total of 34, five-point composite surface soil samples were collected and analyzed for PCB homologs. Samples collected from four locations in Sauget and two locations in East St. Louis had PCB concentrations which exceeded the preliminary remediation goal of 1 part per million (ppm).

Subsequently, an air deposition model analysis was completed in January 2011, which correlated the 2009 soil sampling results with estimated emissions from the PCB manufacturing process. The model estimated that PCB concentrations in soil in excess of 1 ppm are potentially present in residential areas of East St. Louis which were not previously sampled.

In August 2012, 10 composite soil samples were collected from residential properties along Wilford Avenue, Falling Springs Road, and Mississippi Avenue, and analyzed for PCBs by Method 680. In addition, nine samples were collected from the northern portion of the former Dead Creek bed, one of which was a composite sample. Analytical results indicted the presence of PCBs and RCRA metals (including arsenic and chromium) in the samples collected from residential soils and the former Dead Creek bed.

## **2.2 Project Objectives**

The overall project objective is to further characterize PCB contamination in soil on public parcels in the City of East St. Louis located near the Solutia facility. The additional data collected will be used to characterize the extent of contamination and contribute to a human health risk evaluation for off-site exposures. Sampling activities were conducted from April 29-30, 2015, and included the collection of 20 composite surface soil samples from properties located between the facility and locations sampled in 2012. The locations are shown on the attached Figure 1. The surface soil samples were collected at a depth of 0 to 6 inches below surface grade (bgs). Duplicate soil samples and equipment blanks were also collected. All samples collected were shipped via FedEx overnight delivery to ALS Environmental (ALS) in Rochester, New York, and analyzed for PCB homologs.

### **3.0 FIELD INVESTIGATION ACTIVITIES**

#### **3.1 Surface Soil Sampling**

The EPA technical lead, Ms. Carolyn Bury, recommended surface soil sampling locations during a meeting held on August 28, 2014. Specific sampling locations were identified on site by the Booz Allen sampling team lead, Mary LeMier, on April 29-30, 2015, based on field conditions. In accordance with the EPA-approved SAP dated March 18, 2015, 20 grab sample locations were identified east of the Solutia, Inc. facility. Prior to conducting soil sampling activities, access to properties was granted via email by the City of East St. Louis, St. Clare County and Comprehensive Behavioral Health Center of East St. Louis.

Soil samples were collected from each location on April 29-30, 2015. Each soil sample was collected from a depth of 0 to 6 inches bgs at each location. Table 2 presents a summary of sampling information, including global positioning system (GPS) location, sample identification, date and time collected, sample type, and analysis requested. Figure 1 presents the soil sampling locations.

As summarized in Table 2, a total of 20 primary soil samples were collected. The sample types, locations, and collection procedures described in the site specific SAP and REPA5 QAPP were followed in the field. For each sample, one (1) four-ounce jar was collected for PCB homolog analysis. Each unpreserved sample container was placed in a cooler with ice after collection. The surface soil samples were analyzed for PCB homologs by EPA Method 680.

Two field duplicate samples were collected during the sampling event (see Table 2 for identification of the duplicate surface soil samples). Each field duplicate was collected in the same manner and analyzed for the same constituents, via the same analytical methods, as its corresponding primary soil sample. An equipment rinsate blank was collected from the hand auger head to ensure that decontamination procedures were effective.

**Table 2: Soil Sampling Information and Analyses**

Sample ID	Collection Date	Collection Time	Sample Type	Analyses	GPS coordinates*
SS-01	04/29/2015	0900	Grab	PCB Homologs	a. 38°36'00.959" N 90°09'28.641 "W b. 38°36'00.879" N 90°09'28.648 "W c. 38°36'00.850" N 90°09'28.611 "W d. 38°36'00.810" N 90°09'28.573 "W e. 38°36'00.772" N 90°09'28.270 "W
SS-02	04/29/2015	0930	Grab	PCB Homologs	a. 38°36'00.376" N 99°30'00.600"W b. 38°36'00.456" N 99°30'00.264"W c. 38°36'00.460" N 99°30'00.226"W d. 38°36'00.500" N 99°30'00.179"W e. 38°36'00.528" N 99°30'00.133"W
SS-03	04/29/2015	0945	Grab	PCB Homologs	a. 38°35'59.247" N 99°09'31.902"W b. 38°35'59.281" N 99°09'31.849"W c. 38°35'59.321" N 99°09'31.795"W d. 38°35'59.350" N 99°09'31.751"W e. 38°35'59.378" N 99°09'31.706"W
SS-04	04/29/2015	1005	Grab	PCB Homologs	a. 38°38'59.011" N 90°09'32.239"W b. 38°38'59.029" N 90°09'32.204"W c. 38°38'59.067" N 90°09'32.157"W d. 38°38'59.100" N 90°09'32.112"W e. 38°38'59.135" N 90°09'32.063"W
SS-05	04/29/2015	1030	Grab	PCB Homologs	a. 38°35'58.666" N 90°09'32.693"W b. 38°35'58.696" N 90°09'32.647"W c. 38°35'58.748" N 90°09'32.603"W d. 38°35'58.763" N 90°09'32.555"W e. 38°35'58.798" N 90°09'32.510"W
SS-06	04/29/2015	1105	Grab	PCB Homologs	a. 38°35'00.039" N 90°09'32.558"W b. 38°36'00.020" N 90°09'32.652"W c. 38°35'59.985" N 90°09'32.687"W d. 38°35'59.953" N 90°09'32.715"W e. 38°35'59.914" N 90°09'32.757"W

Sample ID	Collection Date	Collection Time	Sample Type	Analyses	GPS coordinates*
SS-07	04/29/2015	1150	Grab	PCB Homologs	a. 38°36'00.222" N 90°09'36.559"W b. 38°36'00.180" N 90°09'36.590"W c. 38°36'00.118" N 90°09'36.164"W d. Too few satellites to pinpoint location e. Too few satellites to pinpoint location
SS-08	04/29/2015	1215	Grab	PCB Homologs	a. 38°36'01.324" N 90°09'36.861"W b. 38°36'01.368" N 90°09'36.908"W c. 38°36'01.307" N 90°09'36.952"W d. 38°36'01.436" N 90°09'36.982"W e. 38°36'01.477" N 90°09'37.028"W
SS-09	04/29/2015	1335	Grab	PCB Homologs	a. 38°36'05.041" N 90°09'34.786"W b. 38°36'05.022" N 90°09'34.852"W c. 38°36'04.997" N 90°09'34.920"W d. 38°36'04.990" N 90°09'34.965"W e. 38°36'04.971" N 90°09'35.026"W
SS-10	04/29/2015	1400	Grab	PCB Homologs	a. 36°36'04.894" N 90°09'40.366"W b. 36°36'04.886" N 90°09'40.337"W c. 36°36'04.846" N 90°09'40.305"W d. 36°36'04.805" N 90°09'40.264"W e. 36°36'04.767" N 90°09'40.226"W
SS-11	04/29/2015	1420	Grab	PCB Homologs	a. 36°36'05.040" N 90°09'41.241"W b. 36°36'05.064" N 90°09'41.276"W c. 36°36'05.101" N 90°09'41.330"W d. 36°36'05.141" N 90°09'41.362"W e. 36°36'05.173" N 90°09'41.411"W
SS-12	04/29/2015	1445	Grab	PCB Homologs	a. 38°36'07.746" N 90°09'36.648"W b. Too few satellites to pinpoint location c. Too few satellites to pinpoint location d. Too few satellites to pinpoint location e. Too few satellites to pinpoint location

Sample ID	Collection Date	Collection Time	Sample Type	Analyses	GPS coordinates*
SS-13	04/30/2015	1025	Grab	PCB Homologs	a. 38°36'14.220" N 90°09'44.468"W b. 38°36'08.581" N 90°09'41.928"W c. 38°36'08.550" N 90°09'41.949"W d. 38°36'08.537" N 90°09'42.004"W e. 38°36'08.499" N 90°09'42.049"W
SS-14	04/30/2015	1045	Grab	PCB Homologs	a. 38°36'07.073" N 90°09'44.624"W b. 38°36'07.102" N 90°09'44.668"W c. 38°36'07.141" N 90°09'44.709"W d. 38°36'07.171" N 90°09'44.754"W e. 38°36'07.200" N 90°09'44.799"W
SS-15	04/30/2015	1125	Grab	PCB Homologs	a. 38°36'07.908" N 90°09'47.250"W b. 38°36'07.958" N 90°09'47.281"W c. 38°36'08.002" N 90°09'47.314"W d. 38°36'08.034" N 90°09'47.329"W e. 38°36'08.072" N 90°09'47.375"W
SS-16	04/30/2015	0935	Grab	PCB Homologs	a. 38°36'12.824" N 90°09'45.911"W b. 38°36'12.851" N 90°09'45.860"W c. 38°36'12.886" N 90°09'45.816"W d. 38°36'12.921" N 90°09'45.774"W e. 38°36'12.944" N 90°09'45.720"W
SS-17	04/30/2015	1000	Grab	PCB Homologs	a. 38°36'11.207" N 90°09'47.155"W b. 38°36'11.174" N 90°09'47.107"W c. 38°36'11.149" N 90°09'47.074"W d. 38°36'11.108" N 90°09'47.028"W e. 38°36'11.064" N 90°09'46.978"W
SS-18	04/30/2015	0915	Grab	PCB Homologs	a. 38°36'13.846" N 90°09'48.383"W b. 38°36'13.804" N 90°09'48.375"W c. 38°36'13.757" N 90°09'48.366"W d. 38°36'13.716" N 90°09'48.338"W e. 38°36'13.667" N 90°09'48.319"W



Sample ID	Collection Date	Collection Time	Sample Type	Analyses	GPS coordinates*
SS-19	04/30/2015	0850	Grab	PCB Homologs	a. 38°36'16.025" N 90°09'50.958"W b. 38°36'15.981" N 90°09'50.982"W c. 38°36'15.932" N 90°09'51.016"W d. 38°36'15.900" N 90°09'51.022"W e. 38°36'15.851" N 90°09'51.057"W
SS-20	04/29/2015	1515	Grab	PCB Homologs	a. 38°36'06.753" N 90°09'38.715"W b. 38°36'06.783" N 90°09'38.751"W c. 38°36'06.822" N 90°09'38.798"W d. "Bad Geometry" e. 38°36'06.876" N 90°09'38.874"W
SS-21 (Duplicate of SS-06)	04/29/2015	1010	Grab	PCB Homologs	a. 38°35'00.039" N 90°09'32.558"W b. 38°36'00.020" N 90°09'32.652"W c. 38°35'59.985" N 90°09'32.687"W d. 38°35'59.953" N 90°09'32.715"W e. 38°35'59.914" N 90°09'32.757"W
SS-22 (Duplicate of SS-13)	04/30/2015	0815	Grab	PCB Homologs	a. 38°36'14.220" N 90°09'44.468"W b. 38°36'08.581" N 90°09'41.928"W c. 38°36'08.550" N 90°09'41.949"W d. 38°36'08.537" N 90°09'42.004"W e. 38°36'08.499" N 90°09'42.049"W
EB-001	04/30/2015	1500	Grab	PCB Homologs	N/A

N/A = not applicable

\*GPS Coordinates collected with a Garmin eTrex Vista handheld receiver.

### **3.2 Sample Custody and Shipment**

The sample number and collection time was written on each sample container. The glass containers were wrapped in bubble wrap. All samples were inserted into a plastic bag along with ice. The plastic bags were closed with tape, the chain-of-custody forms were taped to the inside of the cooler lids, and the coolers were taped shut and secured with custody seals. All of the samples collected were shipped to ALS in Rochester, New York via FedEx. Samples were collected and shipped on the same day. All samples were received by the laboratory in good physical condition and within  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Chain-of-Custody forms are included in Attachment C.

### **3.3 Investigation-Derived Waste, Waste Sampling, and Waste Disposal**

As prescribed by the SAP, water from the decontamination of the hand auger was returned to the ground. No disposable sampling equipment was used to collect the sample from the hand auger. Disposable personal protective equipment (PPE) was bagged and disposed as non-hazardous waste off site.

### **3.4 Field Documentation**

Booz Allen field personnel captured field activities with photographs during the field investigation. The photographs were consolidated into a photographic log and are presented as Attachment A. In addition, Booz Allen recorded all field activities conducted on April 29-30, 2015 in field logbooks. Copies of these logbooks are presented as Attachment B.

### **3.5 Deviations from the QAPP**

The following deviations from the EPA-approved QAPP, dated October 31, 2012 and the site specific SAP dated March 18, 2015, occurred during the sampling at this site.

- SAP - Page 13, Table 6-2 Proposed Soil Sample Locations lists sample locations SS-21 and SS-22 as duplicates of SS-03 and SS-16 respectively. However, in the field SS-21 and SS-22 were collected as duplicates of SS-6 and SS-16, respectively. This deviation is not anticipated to affect sample analysis.

## **4.0 SUMMARY**

The following sections summarize the findings of this investigation.

### **4.1 Surface Soil Sampling**

Twenty grab surface soil samples were collected east of the Solutia facility. Of note:

- Soil samples were collected at 0 to 6 inches bgs.
- Duplicate samples were obtained from sample locations SS-21 and SS-22 which are labeled SS-6 and SS-16, respectively, in the analytical report.

Soil samples were analyzed for PCB homologs. The analytical data report is provided in Attachment D. A summary of the analytical results is presented below in Table 3: Analytical Data Summary.

**Table 3: Analytical Summary for Soil Samples Collected on April 29-30, 2015 in Sauget, Illinois**

Sample ID Sample Date	SS-01 4/29/2015	SS-02 4/29/2015	SS-03 4/29/2015	SS-04 4/29/2015	SS-05 4/29/2015	SS-06 4/29/2015	SS-07 4/29/2015	SS-08 4/29/2015	SS-09 4/29/2015	SS-10 4/29/2015
<b>PCBs</b>	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Monochlorobiphenyls	<b>4.4</b>	<b>20</b>	<b>27</b>	<b>9</b>	<b>12</b>	43 U	<b>13</b>	<b>12</b>	<b>6.8</b>	<b>14</b>
Dichlorobiphenyls	0.83 U	<b>60</b>	<b>84</b>	<b>14</b>	<b>11</b>	43 U	0.87 U	0.87 U	0.4 U	4.2 U
Trichlorobiphenyls	<b>2.1</b>	<b>120</b>	<b>460</b>	<b>77</b>	<b>72</b>	<b>220</b>	<b>3.1</b>	<b>1.8</b>	<b>1.5</b>	<b>9.8</b>
Tetrachlorobiphenyls	<b>7.9</b>	<b>830</b>	<b>1200</b>	<b>200</b>	<b>330</b>	<b>4100 J</b>	<b>18</b>	<b>15</b>	<b>6.6</b>	<b>43</b>
Pentachlorobiphenyls	<b>15</b>	<b>1700</b>	<b>1300</b>	<b>210</b>	<b>470</b>	<b>6700 J</b>	<b>36</b>	<b>32</b>	<b>10</b>	<b>61</b>
Hexachlorobiphenyls	<b>32</b>	<b>2200</b>	<b>1300</b>	<b>260</b>	<b>590</b>	<b>4200</b>	<b>47</b>	<b>37</b>	<b>11</b>	<b>75</b>
Heptachlorobiphenyls	<b>25</b>	<b>1400</b>	<b>740</b>	<b>170</b>	<b>400</b>	<b>1400</b>	<b>31</b>	<b>22</b>	<b>8.9</b>	<b>52</b>
Octachlorobiphenyls	<b>21</b>	<b>480</b>	<b>230 J</b>	<b>63</b>	<b>140</b>	<b>400 J</b>	<b>36</b>	<b>30</b>	<b>16</b>	<b>110</b>
Nonachlorobiphenyls	<b>67</b>	<b>190</b>	<b>70</b>	<b>38</b>	<b>48</b>	170 U	<b>120</b>	<b>86</b>	<b>42</b>	<b>450</b>
Decachlorobiphenyls	<b>170</b>	<b>530</b>	<b>140</b>	<b>99</b>	<b>120</b>	<b>260</b>	<b>260</b>	<b>220</b>	<b>99</b>	<b>1200</b>
Total	<b>344.4</b>	<b>7,530</b>	<b>5,551</b>	<b>1,140</b>	<b>2,193</b>	<b>17,280</b>	<b>564.1</b>	<b>455.8</b>	<b>201.8</b>	<b>2,014.8</b>

**Bolded** results indicate detections above the method reporting limit (MRL).

Indicates that the sample results exceeded the screening level of 1,000 µg/kg

U indicates that the analyte was not detected

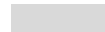
B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result

J Estimated value due to either data validation results or the concentration is between the MRL and the method detection limit (MDL).

µg/kg = Micrograms per kilogram

Sample ID Sample Date	SS-11 4/29/2015	SS-12 4/29/2015	SS-13 4/30/2015	SS-14 4/30/2015	SS-15 4/30/2015	SS-16 4/30/2015	SS-17 4/30/2015	SS-18 4/30/2015	SS-19 4/30/2015	SS-20 4/29/2015
<b>PCBs</b>	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Monochlorobiphenyls	<b>14 J</b>	<b>24</b>	<b>3.9</b>	<b>12</b>	<b>340</b>	<b>33</b>	<b>5.2</b>	<b>23</b>	<b>12</b>	<b>4.9</b>
Dichlorobiphenyls	<b>3.1 J</b>	1 U	2 U	2.1 U	2.1 U	4.3 U	<b>1.3</b>	<b>21</b>	1.3 U	1.9 U
Trichlorobiphenyls	<b>9.1 J</b>	<b>15</b>	<b>2.5</b>	<b>8</b>	<b>12</b>	<b>6.1</b>	<b>2.3</b>	<b>52</b>	<b>3.5</b>	1.9 U
Tetrachlorobiphenyls	<b>39 J</b>	<b>45</b>	<b>10</b>	<b>26</b>	<b>40</b>	<b>36</b>	<b>8.9</b>	<b>170</b>	<b>17</b>	<b>6.6</b>
Pentachlorobiphenyls	<b>120 J</b>	<b>48</b>	<b>21</b>	<b>48</b>	<b>38</b>	<b>84</b>	<b>20</b>	<b>390</b>	<b>45</b>	<b>16</b>
Hexachlorobiphenyls	<b>210 J</b>	<b>50</b>	<b>24</b>	<b>50</b>	<b>37</b>	<b>100</b>	<b>33</b>	<b>870</b>	<b>61</b>	<b>27</b>
Heptachlorobiphenyls	<b>130 J</b>	<b>35</b>	<b>16</b>	<b>27</b>	<b>24</b>	<b>61</b>	<b>21</b>	<b>800</b>	<b>48</b>	<b>20</b>
Octachlorobiphenyls	<b>77 J</b>	<b>30</b>	<b>32</b>	<b>40</b>	6.4 U	<b>95</b>	<b>36</b>	<b>1200</b>	<b>60</b>	<b>16</b>
Nonachlorobiphenyls	<b>160 J</b>	<b>93</b>	<b>130</b>	<b>160</b>	8.5 U	<b>450</b>	<b>140</b>	<b>2700</b>	<b>160</b>	<b>34</b>
Decachlorobiphenyls	<b>360 J</b>	<b>250</b>	<b>400</b>	<b>500</b>	11 U	<b>1500</b>	<b>400</b>	<b>2500</b>	<b>330</b>	<b>100</b>
Total	<b>1,122.2</b>	<b>590</b>	<b>639.4</b>	<b>871</b>	<b>491</b>	<b>2,365.1</b>	<b>667.7</b>	<b>8,726</b>	<b>736.5</b>	<b>224.5</b>

**Bolded** results indicate detections above the method reporting limit (MRL).

 Indicates that the sample results exceeded the screening level of 1,000 µg/kg

U indicates that the analyte was not detected

B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result

J Estimated value due to either data validation results or the concentration is between the MRL and the method detection limit (MDL).

µg/kg = Micrograms per kilogram

Sample ID Sample Date	SS-21/DUP SS-06 4/29/2015	SS-22/DUP SS-13 4/30/2015	EB-1 4/30/15
<b>PCBs</b>	µg/kg	µg/kg	µg/L
Monochlorobiphenyls	43 U	2.7	0.0047
Dichlorobiphenyls	43 U	2 U	0.0047
Trichlorobiphenyls	150	2.7	0.0047
Tetrachlorobiphenyls	2100	8.4	0.0094
Pentachlorobiphenyls	4200	18	0.012 B
Hexachlorobiphenyls	3200	22	0.01
Heptachlorobiphenyls	1300	16	0.014
Octachlorobiphenyls	420	27	0.014
Nonachlorobiphenyls	180 U	130	0.019
Decachlorobiphenyls	220 U	370	0.024
Total	11,370	596.8	

**Bolded** results indicate detections above the method reporting limit (MRL).

Indicates that the sample results exceeded the screening level of 1,000 µg/kg

U indicates that the analyte was not detected

B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result

J Estimated value due to either data validation results or the concentration is between the MRL and the method detection limit (MDL).

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

## 4.2 IDW Sampling

As per the site specific SAP, disposable sampling equipment was used and disposed of as general solid waste. Decontamination water for the hand auger was return to the ground at the end of the sampling event.

## 4.3 Data Quality and Conclusion

With the exception of the deviations listed in Section 3.5, the investigation was conducted as described in the QAPP and site specific SAP. As shown in Table 4, PCB concentrations were detected above the EPA Regional Screening Level (RSL) for residential soil of 1,000 µg/kg in ten samples (SS-2, SS-3, SS-04, SS-05, SS-6, SS-10, SS-11, SS-16, SS-18, and SS-21, which is a duplicate of SS-06).

As requested by EPA, Booz Allen performed a full data validation on 25 percent of the samples analyzed for PCBs which were detected above the screening level of 1,000 µg/kg. Specifically data validation was performed on samples SS-03, SS, 06, and SS-011. The data validation report is provided in Attachment E. The data for the samples were found to be valid. No data were rejected. The data validation did indicate that a “J” qualifier should be added to the samples validated, SS-03, SS-06, and SS-011, as follows:

Sample	Compound	Qualifier	Reason
SS-03	Octachlorobiphenyls, total	J	High matrix spike recovery
SS-06	Octachlorobiphenyls, total	J	High matrix spike recovery
	Tetrachlorobiphenyls, total	J	Poor replicate precision
	Pentachlorobiphenyls, total		
SS-11	Octachlorobiphenyls, total	J	High matrix spike recovery and low surrogate recovery
	All target analytes <i>except</i> : Octachlorobiphenyls, total	J	Low surrogate recovery

**FIGURE 1**  
**SAMPLING LOCATIONS MAP**



**APPENDIX A**  
**PHOTOGRAPHIC LOG**

**APPENDIX B**  
**COPIES OF LOGBOOKS**

**APPENDIX C**

**CHAIN OF CUSTODY FORMS**

## **APPENDIX D**

### **ANALYTICAL DATA REPORT (Provided on CD)**

**APPENDIX E**  
**DATA VALIDATION REPORT**

**FIGURE 1**  
**SAMPLING LOCATIONS MAP**

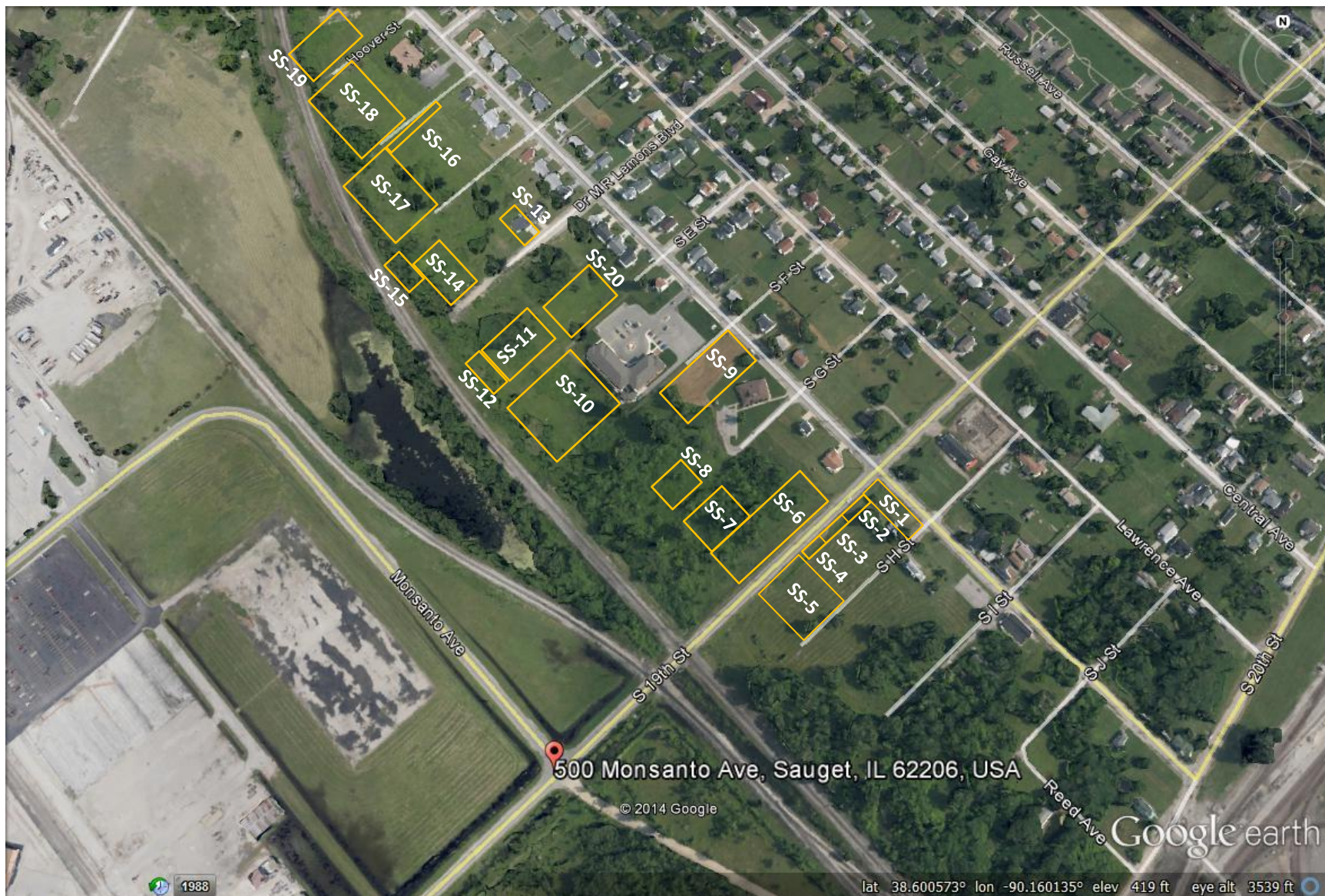


Figure 1 – Sampling Locations Map

**APPENDIX A**  
**PHOTOGRAPHIC LOG**





**Photo Number:** 1  
**Direction:** Looking south  
**Description:** SS-01

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 08:37  
**File Number:** 0330.JPG



**Photo Number:** 2  
**Direction:** N/A  
**Description:** Aliquot 1 SS-01

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 08:19  
**File Number:** 0329.JPG



**Photo Number:** 3  
**Direction:** Looking west  
**Description:** Overview of SS-02

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 0855  
**File Number:** 0331.JPG



**Photo Number:** 4  
**Direction:** Facing west  
**Description:** Overview of SS-03

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 09:14  
**File Number:** 0332.JPG



**Photo Number:** 5  
**Direction:** Facing east  
**Description:** Overview of SS-04

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 0936  
**File Number:** 0333.JPG



**Photo Number:** 6  
**Direction:** Facing south  
**Description:** Overview of SS-05

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 10:13  
**File Number:** 0334.JPG





**Photo Number:** 7

**Direction:** Facing south

**Description:** Overview of SS-06/SS-21

**Photographer:** Mary Lemier

**Date:** 04/29/2015 – 10:13

**File Number:** 0335.JPG



**Photo Number:** 8

**Direction:** Facing north

**Description:** Overview of SS-7

**Photographer:** Mary Lemier

**Date:** 04/29/2015 – 11:14

**File Number:** 0336.JPG



**Photo Number:** 9  
**Direction:** Facing north  
**Description:** Overview of SS-08

**Photographer:** Mary Lemier  
**Date:** 04/2; /2015 – 11:14  
**File Number:** 0337.JPG



**Photo Number:** 10  
**Direction:** NA  
**Description:** Close-up of SS-08.

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 11:24  
**File Number:** 0338.JPG





**Photo Number:** 11

**Direction:** Facing south

**Description:** Overview of SS-10

**Photographer:** Mary Lemier

**Date:** 04/29/2015 – 12:32

**File Number:** 0339.JPG



**Photo Number:** 12

**Direction:** Facing north

**Description:** Overview of SS-11

**Photographer:** Mary Lemier

**Date:** 04/29/2015 – 01:31

**File Number:** 0340.JPG



**Photo Number:** 13

**Direction:** Facing east

**Description:** Overview of SS-12

**Photographer:** Mary Lemier

**Date:** 04/29/2015 – 02:01

**File Number:** 0341.JPG



**Photo Number:** 14

**Direction:** Facing south

**Description:** Close-up of SS-20

**Photographer:** Mary Lemier

**Date:** 04/29/2015 – 02:21

**File Number:** 0342.JPG



**Photo Number:** 15  
**Direction:** Facing north  
**Description:** Overview of SS-20

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 02:21  
**File Number:** 0343.JPG



**Photo Number:** 16  
**Direction:** NA  
**Description:** Coolers ready for shipping

**Photographer:** Mary Lemier  
**Date:** 04/29/2015 – 03:10  
**File Number:** 0344.JPG





**Photo Number:** 17

**Direction:** NA

**Description:** Cooler with seal

**Photographer:** Mary Lemier

**Date:** 04/29/2015 – 03:10

**File Number:** 0345.JPG



**Photo Number:** 18  
**Direction:** Facing southwest  
**Description:** Overview of SS-19

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 07:56  
**File Number:** 0346.JPG



**Photo Number:** 19  
**Direction:** Facing south  
**Description:** Overview of SS-18

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 08:21  
**File Number:** 0347.JPG



**Photo Number:** 20  
**Direction:** Facing south  
**Description:** Overview of SS-18

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 08:21  
**File Number:** 0348.JPG



**Photo Number:** 21  
**Direction:** Facing east  
**Description:** Overview of SS-16

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 08:45  
**File Number:** 0349.JPG





**Photo Number:** 22  
**Direction:** Facing south  
**Description:** Overview of SS-17

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 09:08  
**File Number:** 0350.JPG



**Photo Number:** 23  
**Direction:** Facing southwest  
**Description:** Overview of SS-13/SS-22

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 09:38  
**File Number:** 0351.JPG



**Photo Number:** 24  
**Direction:** Facing southwest  
**Description:** Overview of SS-14.

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 09:52  
**File Number:** 0352.JPG



**Photo Number:** 25  
**Direction:** Facing south  
**Description:** Close-up of SS-15.

**Photographer:** Mary Lemier  
**Date:** 04/30/2015 – 10:30  
**File Number:** 0353.JPG





**Photo Number:** 26

**Direction:** Facing southwest

**Description:** Overview of SS-15

**Photographer:** Mary Lemier

**Date:** 04/52/2015 – 10:31

**File Number:** 0354.JPG



**Photo Number:** 27

**Direction:** Facing east

**Description:** Overview of SS-15

**Photographer:** Mary Lemier

**Date:** 04/30/2015 – 10:31

**File Number:** 0355.JPG



**Photo Number:** 28

**Direction:** NA

**Description:** Coolers ready for shipping

**Photographer:** Mary Lemier

**Date:** 04/30/2015 – 14:16

**File Number:** 0356.JPG



**Photo Number:** 29

**Direction:** NA

**Description:** Cooler ready for shipping

**Photographer:** Mary Lemier

**Date:** 04/30/2015 – 14:16

**File Number:** 0357.JPG

**APPENDIX B**  
**COPIES OF LOGBOOKS**





Address \_\_\_\_\_

Phone \_\_\_\_\_

Project

Clear Vinyl Protective Slipcovers (Item No. 30) are available for this style of notebook. Helps protect your notebook from wear & tear. Contact your dealer or the J. L. Darling Corporation

CONTENTS		
PAGE	REFERENCE	DATE
	Soil Sampling Near Solutia Inc Sauget Illinois	
	April 29 - 30, 2015	
	Field team: Mary Lemler BAH Mereditth Watson - Terra next	

4-29-2015

Weather: Sunny with some  
clouds High 70°  
RPE - Level D

SS-01 sample time 0900

10' ft from curb approx. 30' from  
19th.

Dark clay soil w/ some garbage  
Trimble GPS has only 1-0 sat.  
so used Moredith cell phone

photos 1-2

1) overview looking South  
2) 1 aliquot

SS-02-0930 sample time  
11' 4" from road

photo: #3 overview  
looking west  
Dark clay soil

MLL  
4-29-2015

*Note in the rain.*

MLL  
4-29-2015



SS-03 @ 0945

photo 4 looking South West  
dark clay / organics gress

SS-04 @ 1005

photo 5 looking East  
dark clay / organics & glass

GPS RT aliquot

SS-01 1 N 38° 36' 00.959"  
2 W 90° 09' 28.641"

3 4 5

SS-01 1 N 38° 36' 00.959"  
W 90° 09' 28.641"  
2 N 38° 36' 00.879"  
W 90° 09' 28.648"  
3 N 38° 36' 00.850"  
W 90° 09' 28.611"  
4 N 38° 36' 00.810"  
W 90° 09' 28.573"  
5 N 38° 36' 00.772"  
W 90° 09' 28.27" NW

4-29-2015  
Note in the Rain.

4-29-2015  
ML



SS-5 @ 1030  
photo looking South

4-1	N 38°	35'	58.666
	W 90°	09'	32.693
4-2	N 38°	35'	58.696
	W 90°	09'	32.647
4-3	N 38°	35'	58.748
	W 90°	09'	32.603
4-4	N 38°	35'	58.763
	W 90°	09'	32.555
4-5	N 38°	35'	58.798
	W 90°	09'	32.510

SS-4 615

4-1	N 38°	35'	59.011
	W 90°	9'	32.239
4-2	N 38°	35'	59.029
	W 90°	9'	32.204
4-3	N 38°	35'	59.067
	W 90°	9'	32.157
4-4	N 38°	35'	59.100
	W 90°	9'	32.112
4-5	N 38°	35'	59.135
	W 90°	9'	32.063

ML  
4-29-2015  
Rite in the Rain

4-29-2015  
ML

SS-03		GPS
A-1	N 38	35 59.247
	W 90	9 31.702
A-2	N 38	35 31.57.281
	W	31.849
A-3	N	59.321
	W	31.795
A-4	N	59.350
	W	31.751
A-5	N	59.378
	W	31.704

5 min

SS-02		GPS
A-1	N 38	36 00.376
	W 99	30 <del>03.06</del> 03.06
A-2	N 38	36 00.456
	W 99	30 <del>05.264</del> 05.264
A-3	N 38	36 00.460
	W 99	30 .226
A-4	N 38	36 00.500
	W 99	30 <del>08.179</del> 08.179
	N 38	36 00.528
	W 99	30 .133

WV  
4-29-2016  
Rite in the Rain

WV  
4-29-2016



4-29-2015  
ML

SS-06/SS-21  
1105 1010

photo 7 looking S overview  
photo 8 looking SE overview

GPS

A-1 38' 36" 00.039 N

90 09' 32.558 W

A-2 38° 36' 00.020 N

90 09' 32.652 W

A-3 38' 36" 59.985 N

90 09' 32.687 W

A-4 38' 35" 59.953 N

90 09' 32.715 W

A-5 38' 35" 57.914 N

90 09' 32.757 W

SS-07 @ 1150

GPS Photo 9

A-1 38' 36" 00.222 N

90 09' 36.559 W

A-2 38' 36" 00.180 N

90 09' 36.559 N

A-3 38' 36" 00.188 W

90 09' 36.559 W

A-4 700 Few Sat.

A-5 700 New Sat

ML 4-29-2015  
Rite in the Rain

SS-08 1215

Photo 10 looking North W.

A-1	38°	36'	01.324
A-2	90	09	36.861

A-3			01.368
			36.908

A-4			01.907
			36.952

A-5			01.436
			36.982

			01.477
			37.028

soil mix of clay, sand, roots

1230 - Drove to Subway for lunch  
 1325 - Back at SS-9 after

Walnut to get more DI

SS-9 Photo 11 looking West  
 Sample time 1335

WJL  
 4-29-2015

Rite in the Rain.

WJL  
 4-29-2015



SS-9 GPS

A-1	38° 36'	05.041"
	90	09
A-2	38	36
	90	09
A-3	same	
A-4	34.920"	
	04.990"	
A-5	34.965"	
	04.971"	
	35.026	

SS-10 1400

photo 12 looking South

GPS

A-1	36° 36'	04.894
	90	09'
A-2	40.366	
	04.886	
A-3	40.337	
	04.846	
A-4	40.305	
	04.805	
A-5	40.264	
	04.767	
	40.226	

 MK-005  
 4-27-05  
 Note in the Rain

 MK-  
 4-29-2015



SS-11 1420

photo 13 looking North

GPS.

A-1 38° 36' 05.040  
90 05' 41.241

A-2

05.064

A-3

41.276

A-4

05.101

41.330

A-5

05.141

41.362

05.154 173

41.411

52m

SS-12 @ 1445

A-1 38 36 07.746

90 09 36.618

A-2 38 36 07.746 m

36.618 m

A-2 A-1 Meredith's phone

38 35 37 N

90 9 57

photo 14 looking East

ML 4-29-2015

ML 4-29-2015

Note in the Rain

55-20 1515

photo 15 sample N

16 looking N

A-1 38° 36' 06.753

90 38.715

A-2 06.783

A-3 38.751

06.822

A-4 38.798

A-5 "bad geometry"

06.876

38.874

1545 left site go to gas  
station to prep for shippingML  
4-29-2015

Rite in the Rain

ML  
4-29-2015



ML  
4-30-2015

4-30-2015

0830 arrive at site after  
picking up ice

Sunny few clouds high 68°

SS-19 @ 850

photo 1 South West

A-1 38° 36' 16.025

90° 09' 50.958

A-2 38 36 15.981

50.982

A-3 15.932

51.016

A-4 15.900

51.022

A-5 15.857

51.057

ML  
4-30-2015

Rite in the Rain

SS-18 @ 0915

photos 2 &amp; 3 looking NE

A-1 380 36 9 13.846 48.383

A-2 13.804

A-3 48.375

A-4 13.757

A-5 48.366

A-6 13.716

A-7 48.338

A-8 13.667

A-9 48.319

SS-16 @ 0935

photo 4 looking E

A-1 38 36 9 12.824

A-2 38 36 9 45.911

A-3 12.851

A-4 45.860

A-5 12.886

A-6 45.816

A-7 12.921

A-8 45.774

A-9 12.944

A-10 45.720

NL  
4-30-2015

Note in the Rain

NL  
4-30-2015



SS-17 @ 6000

photo 5 looking South

Soil clay/sand, some black color

A-1 38

36' 11.207"

90

47.155

A-2

11.174

A-3

47.107

11.149

A-4

47.074

11.108

A-5

47.028

11.064

46.978

SS-13 @ 1025

SS-22 @ 815 Dup SS-13

photo 6 looking SW

A-1 38

36 14.220

90

44.468

A-2

8.581

41.928

A-3

8.550

41.947

A-4

8.537

42.004

A-5

8.499

42.049

4-30-2015

ML

Rite in the Rain.

4-30-2015

ML

4-30-2015  
ML

SS 14 @ 1045  
A-1 38 36 7.073  
90 7 44.624  
A-2 7.102  
44.668  
A-3 7.141  
44.709  
A-4 7.171  
44.754  
A-5 7.200  
44.799  
photo 7 looking SW

SS-15 @ 1125<sup>08</sup>  
A-1 38 36 07.965<sup>ML</sup>  
90 9 47.295<sup>ML</sup> 50  
A-2 7.958  
47.281  
A-3 8.002  
47.314  
A-4 8.034  
47.329  
A-5 8.072  
47.375

4-30-2015  
ML

Rite in the Rain



4-30-2015  
ML

SD-15 cont.

plus to 8 sample

W looking

SD overviews

E overview

1140 Decan auger protect in  
foil & leave site for  
lunch

1230-1300 Pack samples on ice  
for shipping

Collect Equip Blank @ 1500  
Re pack for shipping

Fed Ex at 1530

ML  
4-30-2015

Rite in the Rain

4/29/15

Solution, Inc.

MPW

0800 Meet BAH in hotel lobby. Mob from STL to Sangre, IL. Stop to buy ice and organize sampling equipment.

0845 Mary Lemier, BAH and Meredith Watson. Terrainnet on-site for soil sampling event. Waiting for GPS unit to locate satellites. Hand auger decontaminated.

1230 Collected samples 501, 02, 03, 04, 05, 06 (plus 21 dup), 07, and 08. Containers on ice. Offsite for lunch. Stop at Walmart for additional field supplies.

1325 Return to site for more samples.

1545 Sampling complete for today. Offsite to convenience store to pack sample containers on ice for shipping.

1650 Cooker submitted to FedEx for shipping.

1700 Arrive at hotel.

MPW

Rite in the Rain

4/29/15

Solution

MPW

## GPS Data

sample time			
SS01	N 38° 36' 8"	W 90° 9' 34"	
SS02	38° 36' 5"	90° 9' 26"	
SS03	38° 36' 3"	90° 9' 28"	
SS04	38° 35' 59"	90° 9' 32"	

Trimble working. No longer using cell phone to collect GPS data.

MPW



- 4/3/15  
 0800 Meet w/ BAH in hotel lobby. Mdb to Sanget, IL from STL. Stop for ice.  
 0830 BAH and Terrence onsite to continue soil sampling activities.  
 1145 Soil sampling complete. HARD auger was decontaminated between each location.  
 Samples collected:  
 SS19, 18, 17, 16, 13 (plus dup 22),  
 SS14, and 15.  
 Offsite for lunch.  
 1305 Leaving Sanget, IL after shopping at convenience store to buy ice and packing containers for shipping.  
 1430 Arrive at STL label to pick up additional 1 lb containers (EB).  
 1500 Collect EB sample from hand auger.  
 Pack coolers and boxes for shipping.  
 1535 Leaving FedEx.

MPV

**APPENDIX C**

**CHAIN OF CUSTODY FORMS**



OF 2



# CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

25248

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 2 OF 2

Project Name <b>Solutia Inc</b>		Project Number <b>PERAS-5533</b>		ANALYSIS REQUESTED (Include Method Number and Container Preservative)											
Project Manager <b>Francie Hedge</b>		Report CC		PRESERVATIVE											
Company/Address <b>2002 Allen Hamilton</b>				<div> <div>GC/MS VOA's ◦ 8260 ◦ 624 ◦ CLP</div> <div>GC/MS SVOA's ◦ 8270 ◦ 625</div> <div>GC VOA's ◦ 8021 ◦ 601/602</div> <div>PESTICIDES ◦ 8081 ◦ 608</div> <div>PCBs ◦ 8082 ◦ 608</div> <div>METALS, TOTAL (List in comments below)</div> <div>METALS, DISSOLVED (List in comments below)</div> </div>											
Phone # <b>847-452-5934</b>		Email <b>Hedge.Francie@solutia.com</b>		<div> <div>Preservative Key</div> <div>0. NONE</div> <div>1. HCL</div> <div>2. HNO3</div> <div>3. H2SO4</div> <div>4. NaOH</div> <div>5. Zn, Acetate</div> <div>6. MeOH</div> <div>7. NaHSO4</div> <div>8. Other</div> </div>											
Sampler's Signature <i>Francie Hedge</i>		Sampler's Printed Name <b>Francie Hedge</b>		REMARKS/ ALTERNATE DESCRIPTION <b>homologs</b>											
CLIENT SAMPLE ID		FOR OFFICE USE ONLY LAB ID		DATE		SAMPLING TIME		MATRIX		NUMBER OF CONTAINERS					
SS-11				4/29/15		1420		Soil		1					
SS-12				4/29/15		1445		Soil		1					
SS-20				4/29/15		1515		Soil		1					
SPECIAL INSTRUCTIONS/COMMENTS															
Metals															
TURNAROUND REQUIREMENTS															
<div> <div>RUSH (SURCHARGES APPLY)</div> <div>1 day 2 day 3 day</div> <div>4 day 5 day</div> </div>															
REPORT REQUIREMENTS															
<div> <div>I. Results Only</div> <div>II. Results + QC Summaries (LCS, DUP, MS/MSD as required)</div> <div>III. Results + QC and Calibration Summaries</div> <div>IV. Data Validation Report with Raw Data</div> </div>															
INVOICE INFORMATION															
<div> <div>PO #</div> <div>30075-0169-2533-1000</div> <div>BILL TO:</div> </div>															
See QAPP <input type="checkbox"/>				STATE WHERE SAMPLES WERE COLLECTED <b>IL</b>				RELINQUISHED BY				RECEIVED BY			
RELINQUISHED BY				RECEIVED BY				RELINQUISHED BY				RECEIVED BY			
Signature <i>Francie Hedge</i>				Signature				Signature				Signature			
Printed Name <b>Francie Hedge</b>				Printed Name				Printed Name				Printed Name			
Firm <b>2002 Allen Hamilton</b>				Firm				Firm				Firm			
Date/Time <b>4/29/15 1645</b>				Date/Time				Date/Time				Date/Time			



Project Name <b>Solutia Inc</b>		Project Number <b>Reps-SS33</b>		ANALYSIS REQUESTED (Include Method Number and Container Preservative)												
Project Manager <b>Francie Kedge</b>		Report of:		PRESERVATIVE												
Company/Address <b>2002 Allen Hamilton</b>				<div style="display: flex; justify-content: space-between;"> <div> GC/MS VOA's ◦ 8260 ◦ 624 ◦ CLP GC/MS SVOA's ◦ 8270 ◦ 625 GC VOA's ◦ 8021 ◦ 601/602 PESTICIDES ◦ 8081 ◦ 608 PCBs ◦ 8082 ◦ 608 METALS, TOTAL (List in comments below) METALS, DISSOLVED (List in comments below) </div> <div> Preservative Key  0. NONE  1. HCL  2. HNO3  3. H2SO4  4. NaOH  5. Zn. Acetate  6. MeOH  7. NaHSO4  8. Other _____ </div> </div>												
Phone # <b>847-452-5934</b>		Email <b>francie.kedge@sol.com</b>														
Sample's Signature <i>Marie Leves</i>		Sample's Printed Name <b>Marie Leves</b>														
CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	DATE	SAMPLING TIME	MATRIX												
SS-19		4/30/2015	0850	Soil												
SS-18		4/30/2015	0915	Soil												
SS-16		4/30/2015	0935	Soil												
SS-17		4/30/2015	1000	Soil												
SS-13		4/30/2015	1025	Soil												
SS-22		4/30/2015	0815	Soil												
SS-14		4/30/2015	1045	Soil												
SS-15		4/30/2015	1125	Soil												
EB-1		4/30/2015	1500	Water												
SPECIAL INSTRUCTIONS/COMMENTS <b>Metals</b>																
STATE WHERE SAMPLES WERE COLLECTED																
RELINQUISHED BY		RECEIVED BY														
Signature <i>Marie Leves</i>		Signature														
Printed Name <b>Marie Leves</b>		Printed Name														
Firm <b>2002 Allen Hamilton</b>		Firm														
Date/Time <b>4/30/2015 1345</b>		Date/Time														
TURNAROUND REQUIREMENTS																
RUSH (SURCHARGES APPLY) ____ 1 day ____ 2 day ____ 3 day ____ 4 day ____ 5 day																
REQUESTED REPORT DATE <b>Standard</b>																
REPORT REQUIREMENTS																
I. Results Only II. Results + QC Summaries (ICS, DUP, MS/MSD as required) III. Results + QC and Calibration Summaries IV. Data Validation Report with Raw Data																
Edtate ____ Yes ____ No																
RELINQUISHED BY																
Signature																
Printed Name																
Firm																
Date/Time																
RECEIVED BY																
Signature																
Printed Name																
Firm																
Date/Time																
INVOICE INFORMATION																
PO # <b>809075-059 2533</b>																
BILL TO: <b>1000001</b>																
<b>2002 Allen Hamilton</b>																

## **APPENDIX D**

### **ANALYTICAL DATA REPORT (Provided on CD)**



**APPENDIX E**  
**DATA VALIDATION REPORT**



**Date:** June 25, 2015

**To:** Frances Hodge  
Booz Allen Hamilton

**From:** Jeanne Peterson  
Analytical Quality Associates, Inc.

**Subject:** Data Validation, PCB Homologue Analysis  
REPA Zone 5  
Analytical Chemistry of Solutia, Inc. Samples  
ALS Environmental – Rochester, NY SDG R1503177

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## SUMMARY

Full validation was performed on the data for three soil samples analyzed for PCB homologues by EPA Method 680. The samples were collected and submitted to ALS Environmental – Rochester (ALS) in Rochester, New York, for analysis. ALS processed the sample and reported the results under sample delivery group (SDG) R1503177.

The analytical data were evaluated with reference to the USEPA Contract Laboratory Program National Functional Guidelines for Organic Review (10/99) and EPA Method 680, *Determination of Pesticides and PCBs in Water and Soil/Sediment by Gas Chromatography/Mass Spectrometry* (11/85).

In general, the data are valid as reported. No data were rejected. Other qualifiers were applied as specified in the Data Qualifiers section below.

See attached data validation spreadsheets for supporting documentation on the data review and validation.

## SAMPLES

The samples included in this validation are listed below.

Sample ID	Laboratory ID	Matrix
SS-03	R1503177-001	Soil
SS-06	R1503177-006	Soil
SS-11	R1503177-012	Soil

**DATA QUALIFIERS** (see following sections for detailed explanations)

Sample	Compound	Qualifier	Reason
SS-03	Octachlorobiphenyls, total	J	High matrix spike recovery
SS-06	Octachlorobiphenyls, total	J	High matrix spike recovery
	Tetrachlorobiphenyls, total Pentachlorobiphenyls, total	J	Poor replicate precision
SS-11	Octachlorobiphenyls, total	J	High matrix spike recovery and low surrogate recovery
	All target analytes <i>except</i> : Octachlorobiphenyls, total	J	Low surrogate recovery

**DISCUSSION****Sample Shipping/Receiving**

All COC, analysis request, and sample receipt documentation was complete and correct.

**Holding Times and Preservation**

The samples were properly preserved and analyzed within the prescribed holding time.

**Instrument Tune**

All instrument tune requirements.

**Calibration and Resolution**

All initial and continuing calibration and resolution QC acceptance criteria were met with the following exceptions.

The percent differences (%Ds) associated with the ending CCV analyzed on May 6, 2015, and the beginning CCV analyzed on May 8, 2015, were >20% with positive bias for 4,4'-DDT. 4,4'-DDT is a surrogate spike compound and, therefore, no sample data were qualified.

The %Ds associated with the ending CCVs analyzed on May 8, 2015, and the beginning CCV analyzed on May 12, 2015, were >20% with negative bias for 4,4'-DDT and <sup>13</sup>C<sub>6</sub>-gamma-BHC, and the relative response factors (RRFs) were <0.05. 4,4'-DDT and <sup>13</sup>C<sub>6</sub>-gamma-BHC are surrogate spike compounds and, therefore, no sample data were qualified.

Insufficient data were submitted in the data package to verify that the signal to noise, abundances, and separation of congener 87 method criteria were met. Visual review of the chromatograms and ion traces for the mid-level standard indicated that the criteria were met; therefore, no sample data were qualified based on professional judgment.

### **Blanks**

Total pentachlorobiphenyls were detected in the equipment blank. The associated sample results were >5X the equipment blank value and, therefore, were not qualified.

No target analytes were detected in the method blank.

### **Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)**

The LCS/LCSD analyses met all laboratory QC acceptance criteria.

### **Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

The MS/MSD analyses met all QC acceptance criteria with the following exceptions.

The MS/MSD recoveries were > the upper acceptance limit for total octachlorobiphenyls. The associated sample results were detects and, therefore, were **qualified J**.

The MS and/or MSD recoveries for six homologues (refer to worksheet) were outside of QC acceptance limits. The parent sample concentration was >4X the spike amount and, therefore, no sample data were qualified based on professional judgment.

### **Surrogate Recoveries**

The surrogate recoveries met laboratory QC acceptance criteria with the following exceptions.

The  $^{13}\text{C}_6$ -gamma-BHC recovery was < the laboratory lower acceptance limit but >10% for sample SS-11. The associated sample results that were detects were **qualified J**, and the associated sample results that were non-detects were **qualified UJ**.

The surrogate recoveries were diluted out of samples SS-03 and SS-06. No sample results were qualified.

### **Retention Times**

All method retention time QC criteria were met. It should be noted that the retention times of the individual ion peaks were not provided in the data package; therefore, selected ion current profiles (SICPs) were reviewed by the validator to verify that the two ion peaks reached maximum height at the same time.

### **Ion Abundance Ratios**

Ion abundances were not submitted in the data package; however, the SICP secondary ion percentages indicate that the abundance criteria were met. No data were qualified based on professional judgment.

### **Sensitivity**

Signal-to-noise information was not submitted in the data package; however, the SICP ion traces indicate that the signal-to-noise criteria were met. No data were qualified based on professional judgment.

### **Field Duplicate**

The relative percent differences (RPDs) between sample SS-06 and its duplicate, SS-21, met all QC acceptance criteria with the following exceptions.

The RPDs were > the acceptance limit for total tetrachlorobiphenyls and total pentachlorobiphenyls. The total tetrachlorobiphenyls and total pentachlorobiphenyls results for sample SS-06 were detects and, therefore, were **qualified J**.

### **Detection Limits/Dilutions**

Method reporting limits (MRLs) were properly reported. Sample SS-03 was diluted 20X, sample SS-06 was diluted 100X, and sample SS-11 was diluted 5X. MRLs were adjusted.

### **Sample Calculations**

Calculations were spot-checked. No discrepancies were noted; however, it should be noted that the response factors for the highest concentration initial calibration (ICAL) standard were not included on the ICAL summary form. Recalculations confirmed that the standard was used to obtain the ICAL average relative response factors and relative standard deviations.

### **Other QC**

No other specific issues that affect data quality were identified.

### **Data Package Completeness**

The data package was complete as received with the following exceptions.

Calibration standard concentrations were not included in the data package. They were requested and received from the laboratory and are included at the end of this report.

Ion abundance, signal-to-noise, and retention time data were not submitted in the data package. Chromatograms, SICPs, and quantitation reports were used to confirm that method criteria were met.

## BAH Organic Data Validation Summary Worksheet

SDG #: R1503177	Project: REPA 5	Validator: Jeanne Peterson	Validation Date: 06/15/2015
Laboratory: ALS Environmental	AR/COC#: 24221		Validation Level: IV
Matrix: Soil	# of Samples: 3*	Tracking docs present: See sample receipt and log-in documentation	
COCs present: Yes	COCs signed: Yes	COCs dated: Yes	Sample Container Integrity: OK
Analyses: <input type="checkbox"/> SW-846 Method: <input checked="" type="checkbox"/> EPA Method: 680 SIM <input type="checkbox"/> CLP SOW: <input type="checkbox"/> ASTM Method: <input type="checkbox"/> IDAHO DEQ:			

Requested Analyses Not Reported			
Client Sample ID	Lab Sample ID	Analysis	Comments
None			

Hold Time/Preservation Outliers								
Client Sample ID	Lab Sample ID	Analysis	Pres.	Collection Date	Preparation Date	Analysis Date	Analysis <2X HT	Analysis ≥2X HT
None								

**Comments:** Collected 04/29/2015  
  
 \*23 samples in data package; however, DV requested for three samples only. Samples -003 (MS/MSD), -006 (-007 FD), and -012 designated for DV.  
  
 PCB Homologues



## BAH Organic GC/MS Worksheet (Method 680)

SDG: R1503177	Method: EPA 680 SIM	Laboratory Sample IDs: R1503177-003, -006, -012	
Matrix: Soil	Batch #: 235076		
Tuning (pass/fail): pass	S/N m/z 499/241 (pass/fail): **	Abundance m/z 502 (pass/fail): **	Separation of Cong 87 (pass/fail): **

*Lab Limits (≤40%)<sup>1</sup>*

Analyte (outliers)	Calibration			Method Blank	5X (10X) Method Blank	LCS %R	LCSD %R	LCS/D %R	MS %R (-003)	MSD %R (-003)	MS/D RPD (-003)	FD (011/007)	EB
	RF >0.05	RSD/r <sup>2</sup> ≤20%	ICV/CCV %D ±20%										
4,4'-DDT (surr) 5/6 end	✓	✓	22.3	✓	NA	✓	✓	✓	NA	NA	NA	✓	✓
4,4'-DDT (surr) 5/8 beginning	✓	✓	26.2	NA	NA	NA	NA	NA	NA	NA	NA	✓	✓
g-BHC (surr) 5/8 end	0.035	✓	-66	NA	NA	NA	NA	NA	NA	NA	NA	✓	✓
4,4'-DDT (surr) 5/8 end	0.003	✓	-99.1	NA	NA	NA	NA	NA	NA	NA	NA	✓	✓
g-BHC (surr) 5/12 end	.037	✓	-64.1	NA	NA	NA	NA	NA	NA	NA	NA	✓	✓
4,4'-DDT (surr) 5/12 end	0.006	✓	-98.2	NA	NA	NA	NA	NA	NA	NA	NA	✓	✓
DiCBs	✓	✓	✓	✓	NA	✓	✓	✓	-68*	-52*	✓	✓	✓
TriCBs	✓	✓	✓	✓	NA	✓	✓	✓	-952*	-892*	✓	✓	✓
TetraCBs	✓	✓	✓	✓	NA	✓	✓	✓	-442*	-172*	✓	64.52	✓
PentaCBs	✓	✓	✓	✓	NA	✓	✓	✓	268*	366*	✓	45.87	0.012
HexaCBs	✓	✓	✓	✓	NA	✓	✓	✓	432*	366*	✓	✓	✓
HeptaCbs	✓	✓	✓	✓	NA	✓	✓	✓	347*	204*	✓	✓	✓
OctaCBs	✓	✓	✓	✓	NA	✓	✓	✓	233	159	✓	✓	✓

Surrogate Recovery Outliers (Soil: 50% - 125% or lab-derived limits)					Ion Abundances/Ratios				
Sample ID	13C6-g-BHC	13C12-4,4'-DDT			Sample	Compound	Abundance	Ion Ratio	Bkgd Noise
-03 20X	0	0			None				
-03 MS 20X	0	0							
-03 MSD 20X	0	0							
-06 100X	0	0							
-07 100X	0	0							
-012 5X	20	✓							

IS Outliers (±30% from last CCV and ±50% from ICAL mean)					Retention Times (77, 104, Surr RTs ±10s of CCV; primary/secondary w/i 1s)			
Sample ID	Chrysene-d10 Area (%)	RT	Phenanthrene-d10 Area (%)	RT	Sample	Compound	RT	Maximization
None					**			

## BAH Organic GC/MS Worksheet (Method 680)

SDG: R1503177	Method: EPA 680 SIM	Laboratory Sample IDs: R1503177-003, -006, -012	
Matrix: Soil	Batch #: 235076		
Tuning (pass/fail): pass	S/N m/z 499/241 (pass/fail): **	Abundance m/z 502 (pass/fail): **	Separation of Cong 87 (pass/fail): **

Comments: HTs OK. NOTE: ICAL summary does not show that the high standard is used in the calculations (the column is missing from the summary); however, recalculation confirms that the high standard was used.

QC identifiers: RQ1504580-01 (MB), -02 (LCS), -03 (LCSD), -04 (MS), -05 (MSD)

\*Parent sample conc >4X spike amount; criteria not applicable.

\*\*Insufficient data in data package; unable to verify; however, c-grams and ion traces indicate that these parameters met criteria.

Individual RTs of quantitation and confirmation ions not included in data package; unable to confirm that they are within 1s of each other.

IS summary for 5/6 has -30% to +50%; IS summaries for 5/8 and 5/12 have -50% to +100%;

<sup>1</sup>Method duplicate criteria; surrogates must meet duplicate criteria.

Revised 06/2015

# Method 680 SIM (PCB Homologues) Calibration Verification for SDG R1503177

Calibration: 5973-B 05/07/2015

Average RF Int. Std. = 0.75

Conc.	Chrysene-d12	Surr Conc	MonoCBs		DecaCBs		g-BHC (surr)		4,4'-DDT (surr)	
			Area	RRF	Area	RRF	Area	RRF	Area	RRF
0.01	360943	0.10	4257	0.885	1320	0.055	1031	0.107	2853	0.296
0.02	359561	0.20	8271	0.863	2833	0.059	2090	0.109	5752	0.300
0.05	364576	1.00	20279	0.834	7415	0.061	5195	0.107	15369	0.316
0.10	363140	5.00	39328	0.812	14807	0.061	10118	0.104	32726	0.338
0.25	369565	10.00	91286	0.741	36206	0.059	25019	0.102	85756	0.348
0.50	375859	20.00	168549	0.673	72991	0.058	50545	0.101	175137	0.349
1.00	374860	50.00	297836	0.596	134144	0.054	93225	0.093	348255	0.348
Multiplier			1		5		2		2	
AveRF			0.772		0.058		0.103		0.328	
RSD			13.81		4.94		5.17		7.15	

	ICV	CCV1 05/06/2015	CCV2 05/06/2015				CCV1 05/08/2015			
	PentaCBs	DiCB	g-BHC (Surr)	4,4'-DDT (surr)	NonaCBs	g-BHC (Surr)	4,4'-DDT (surr)	TriCBs	g-BHC (Surr)	4,4'-DDT (surr)
Int. Std. Response	398615	378054	378054	378054	391798	391798	391798	341129	341129	341129
Analyte Response	18860	29098	10681	34160	17454	11156	41908	18410	9892	37687
Analyte Concentration	0.20	0.10	0.20	0.20	0.40	0.20	0.20	0.10	0.20	0.20
Int. Std. Concentration	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
CCRF	0.177	0.577	0.106	0.339	0.084	0.107	0.401	0.405	0.109	0.414
Ave RF	0.193	0.564	0.103	0.328	0.074	0.103	0.328	0.398	0.103	0.328
Calc'd Concentration	0.184	0.102	0.206	0.207	0.452	0.207	0.245	0.102	0.211	0.253
CCV %D	-8.07	2.35	2.86	3.31	12.88	3.67	22.29	1.70	5.57	26.31

	CCV2 05/08/2015			CCV1 05/12/2015			CCV2 05/12/2015		
	OctaCBs	g-BHC (Surr)	4,4'-DDT (surr)	TetraCBs	g-BHC (Surr)	4,4'-DDT (surr)	HeptaCBs	g-BHC (Surr)	4,4'-DDT (surr)
Int. Std. Response	321489	321489	321489	339482	339482	339482	320956	320956	320956
Analyte Response	14133	2959	297	21393	8859	31604	18494	3163	544
Analyte Concentration	0.30	0.20	0.20	0.20	0.20	0.20	0.30	0.20	0.20
Int. Std. Concentration	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
CCRF	0.110	0.035	0.003	0.236	0.098	0.349	0.144	0.037	0.006
Ave RF	0.097	0.103	0.328	0.245	0.103	0.328	0.141	0.103	0.328
Calc'd Concentration	0.340	0.067	0.002	0.193	0.190	0.213	0.306	0.072	0.004
CCV %D	13.30	-66.49	-98.94	-3.55	-4.99	6.43	2.17	-64.12	-98.06

235076	MB	LCS	LCSD	-003	-003 MS	-003 MSD	-06	-007 (FD)	-012
%Solid	100	100	100	80.6	80.6	80.6	76.5	75.9	80.7
Dilution/DF	1	1	1	20	20	20	100	100	5
Final Volume (mL)	1	1	1	1	1	1	1	1	1
Sample Aliquot (g)	30	30	30	30	30	30	30	30	30
Surrogate	g-BHC	4,4'-DDT	g-BHC	4,4'-DDT	g-BHC	4,4'-DDT	g-BHC	4,4'-DDT	g-BHC
IS Response	329219	334404	354638	328257	321018	321677	304427	324512	311892
Surr Response	27285	124144	39142	0	0	0	0	0	1910
Calibration R.F.	0.103	0.328	0.103	0.328	0.103	0.328	0.103	0.328	0.103
Surr spike Conc. (mg/L)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Surr spike Conc. (ug/kg)	33.33	33.33	33.33	41.36	41.36	41.36	43.57	43.92	41.31
Surr Conc. (ug/kg)	20.1	28.3	26.8	0.0	0.0	0.0	0.0	0.0	9.2
Surr %REC	60	85	80	0	0	0	0	0	22
	TC	DiCBs	DiCBs	TetraCBs	TetraCBs	TetraCBs	PentaCBs	PentaCBs	DecaCBs
IS Response		334404	354638	328257	321018	321677	304427	324512	311892
TC Response		71427	76080	160819	134078	148491	119776	80745	42448
Calibration R.F.		0.564	0.564	0.245	0.245	0.245	0.193	0.193	0.058
TC Conc. (ug/kg)		9.468	9.509	1240.487	1057.541	1168.824	6662.050	4246.448	363.464
Amount Spiked		16.70	16.70		41.40	41.40			
%R		56.69	56.94		-441.90	-173.10			
RPD		0.44			10.00				



# STANDARD OPERATING PROCEDURE

PCB Homologs  
SOC-680, Rev. 8  
Effective: 2/8/15  
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Table 2 Composition and Approximate Concentrations of Calibration Standards

Concentrations in ppm									
Compound	CAL 00	CAL 0	CAL 0.5	CAL 1	CAL 1.5	CAL 2	CAL 3	CAL 5	Stock
Cal Congener									
Cl <sub>1</sub> (#1)	0.01	0.02	0.05	0.1	0.25	0.5	1.0	5.0	50
Cl <sub>2</sub> (#5)	0.01	0.02	0.05	0.1	0.25	0.5	1.0	5.0	50
Cl <sub>3</sub> (#29)	0.01	0.02	0.05	0.1	0.25	0.5	1.0	5.0	50
Cl <sub>4</sub> (#50)	0.02	0.04	0.1	0.2	0.5	1.0	2.0	10	100
Cl <sub>5</sub> (#87)	0.02	0.04	0.1	0.2	0.5	1.0	2.0	10	100
Cl <sub>6</sub> (#154)	0.02	0.04	0.1	0.2	0.5	1.0	2.0	10	100
Cl <sub>7</sub> (#188)	0.03	0.06	0.15	0.3	0.75	1.5	3.0	15	150
Cl <sub>8</sub> (#200)	0.03	0.06	0.15	0.3	0.75	1.5	3.0	15	150
Cl <sub>10</sub> (#209)	0.05	0.1	0.25	0.5	1.25	2.5	5.0	25	250
RT Congeners									
Cl <sub>4</sub> (#77)	0.02	0.04	0.1	0.2	0.5	1	2	10	100
Cl <sub>5</sub> (#104)	0.02	0.04	0.1	0.2	0.5	1	2	10	100
Cl <sub>9</sub> (#208)	0.04	0.08	0.2	0.4	1.0	2	4	20	200
Internal Standards									
Chrysene-d <sub>12</sub>	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
Phenanthrene-d <sub>10</sub>	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
Surrogate Compounds									
<sup>13</sup> C <sub>6</sub> -gamma BHC	0.02	0.04	0.1	0.2	0.5	1	2	10	
<sup>13</sup> C <sub>12</sub> -4,4'-DDT	0.02	0.04	0.1	0.2	0.5	1	2	10	

Table 3  
Criteria for DFTPP Spectrum

<b>m/z</b>	<b>Relative Abundance</b>
127	40-60%
197	<1%
198	100% (Base Peak)
199	5-9%
275	10-30%
365	>1%
441	Present and < m/z 443
442	>50%
443	17-23% of m/z 442



Data File : I:\ACQUDATA\5973B\DATA\050615\DK910.D

Vial: 7

Acq On : 6 May 2015 11:04 am

Operator: J.Misiurewicz

Sample : CAL STD 1.0

Inst : 5973-B

Misc : Initial Calibration 680 PCB

Multiplr: 1.00

MS Integration Params: INTIS.P

Quant Time: May 7 6:38 2015

Quant Results File: 6800506.RES

Quant Method : I:\ACQUDATA\5973B\METHODS\6800506.M (RTE Integrator)

Title : 680.PCB by SIM

Last Update : Wed May 06 14:13:31 2015

Response via : Initial Calibration

DataAcq Meth : 680

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev (Min)
1) d10-Phenanthrene	11.18	188	343929	0.75	ppm	0.00
2) d12-Chrysene	16.90	240	363140	0.75	ppm	0.00

## System Monitoring Compounds

5) SURR1, gamma-BHC	10.96	219	10118	0.20	ppm	0.00
Spiked Amount	1.000	Range	63 - 119	Recovery	=	20.00%#
13) SURR2, 4-4'-DDT	16.06	235	32726	0.21	ppm	0.00
Spiked Amount	1.000	Range	62 - 181	Recovery	=	21.00%#

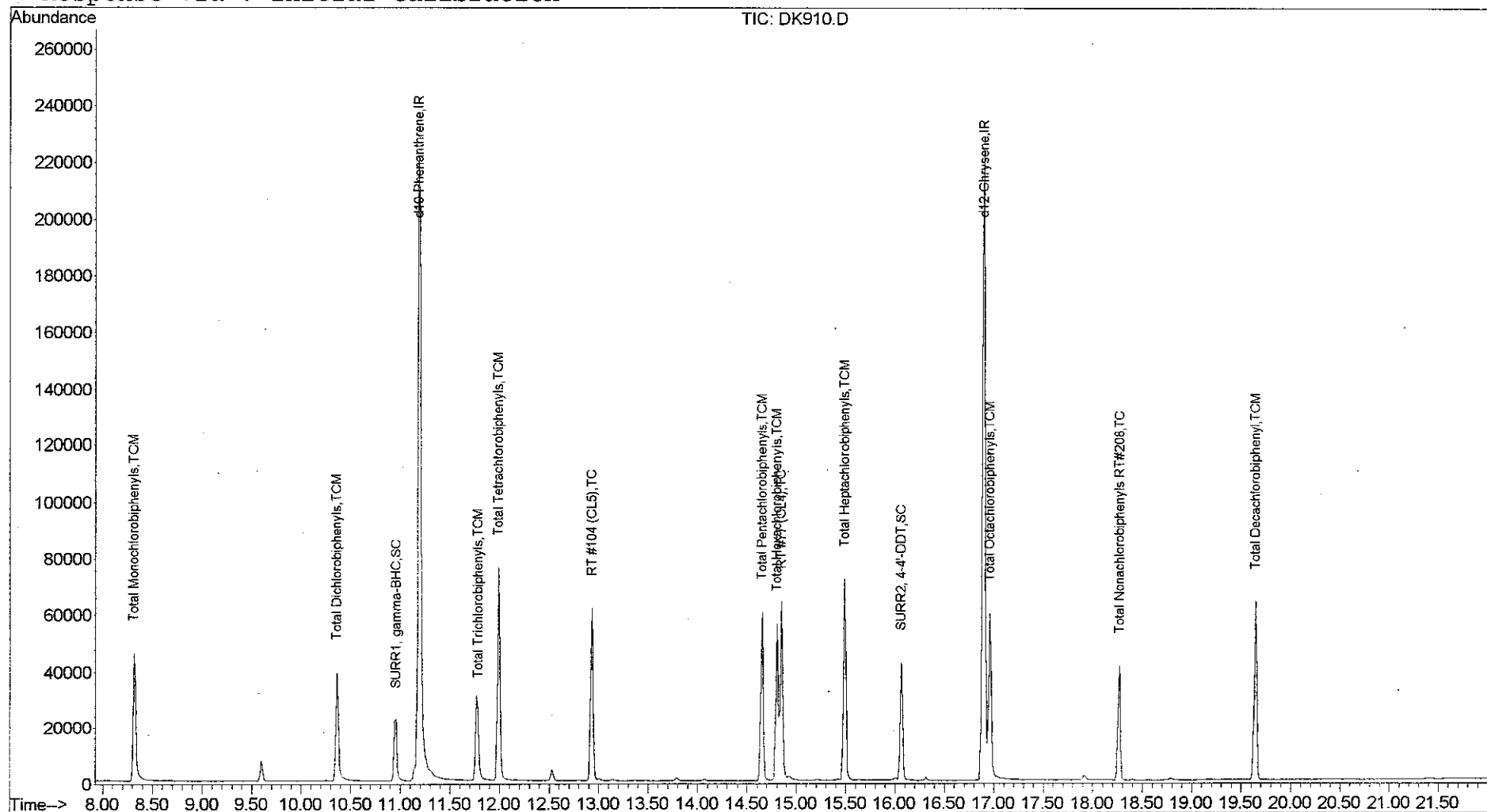
## Target Compounds

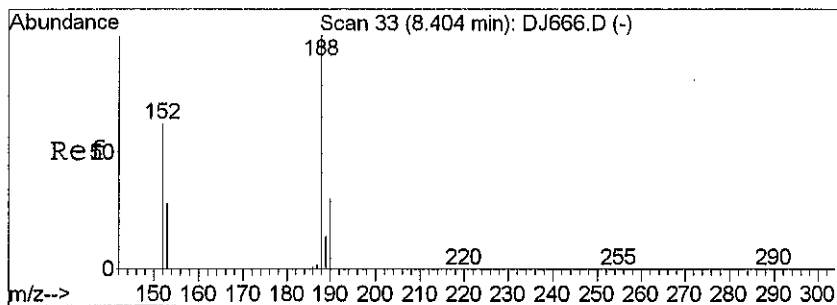
	R.T.	QIon	Response	Conc	Units	Qvalue
3) Total Monochlorobiphenyls	8.31	188	39328	0.106	ppm	87
4) Total Dichlorobiphenyls	10.36	222	28692	0.105	ppm	95
6) Total Trichlorobiphenyls	11.78	256	20061	0.104	ppm	93
7) Total Tetrachlorobiphenyls	11.99	292	24660	0.208	ppm	99
8) RT #104 (CL5)	12.93	324	15652	0.205	ppm	98
9) Total Pentachlorobiphenyls	14.65	326	19305	0.207	ppm	100
10) Total Hexachlorobiphenyls	14.80	360	16776	0.210	ppm	99
11) RT #77 (CL4)	14.85	292	33026m	0.211	ppm	
12) Total Heptachlorobiphenyls	15.48	394	20766	0.304	ppm	98
14) Total Octachlorobiphenyls	16.96	428	14675	0.313	ppm	92
15) Total Nonachlorobiphenyls	18.26	464	15306	0.427	ppm	95
16) Total Decachlorobiphenyl	19.64	498	14807	0.526	ppm	95

# Quantitation Report

Data File : I:\ACQUDATA\5973B\DATA\050615\DK910.D Vial: 7  
 Acq On : 6 May 2015 11:04 am Operator: J.Misiurewicz  
 Sample : CAL STD 1.0 Inst : 5973-B  
 Misc : Initial Calibration 680 PCB Multiplr: 1.00  
 MS Integration Params: INTIS.P  
 Quant Time: May 7 6:38 2015 Quant Results File: 6800506.RES

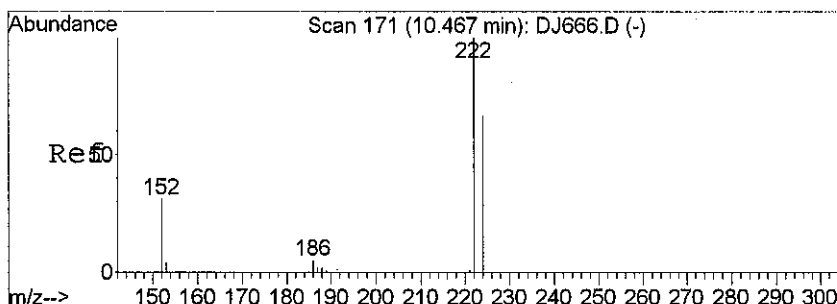
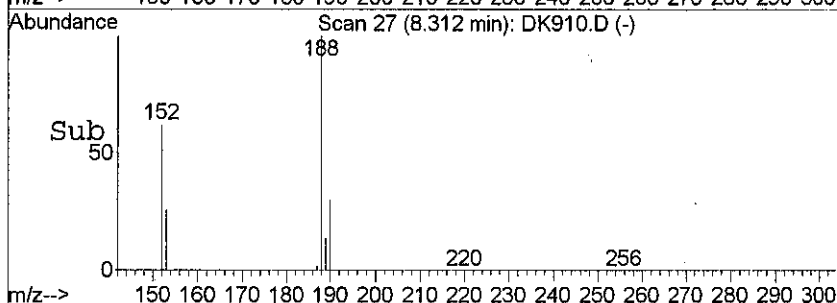
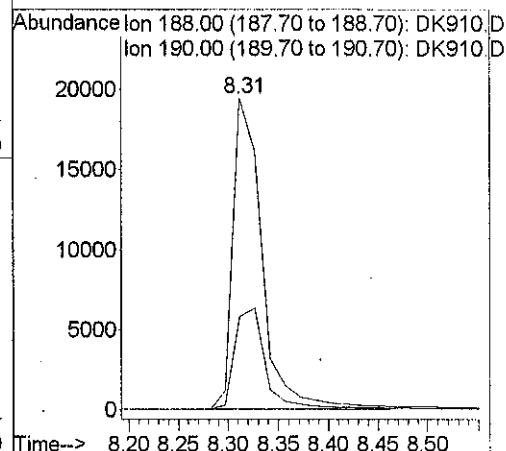
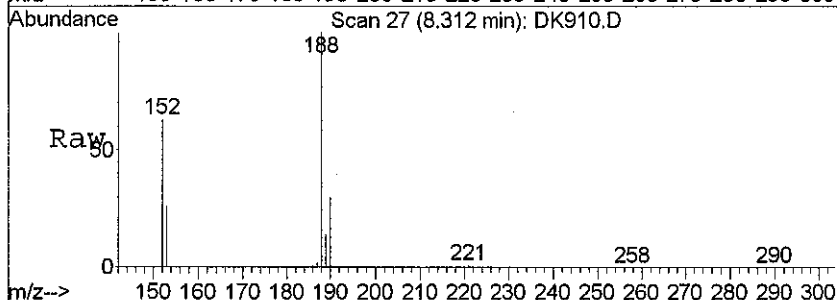
Method : I:\ACQUDATA\5973B\METHODS\6800506.M (RTE Integrator)  
 Title : 680.PCB by SIM  
 Last Update : Thu May 07 07:09:19 2015  
 Response via : Initial Calibration





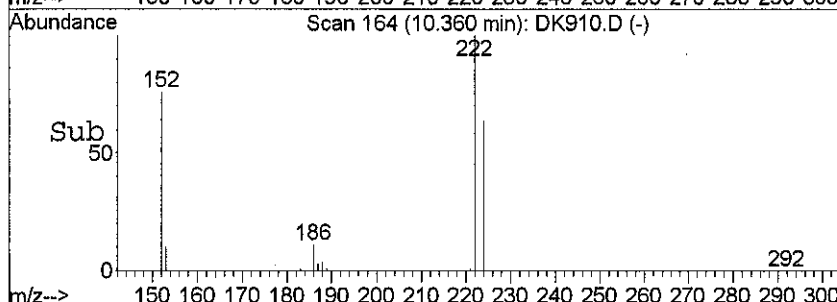
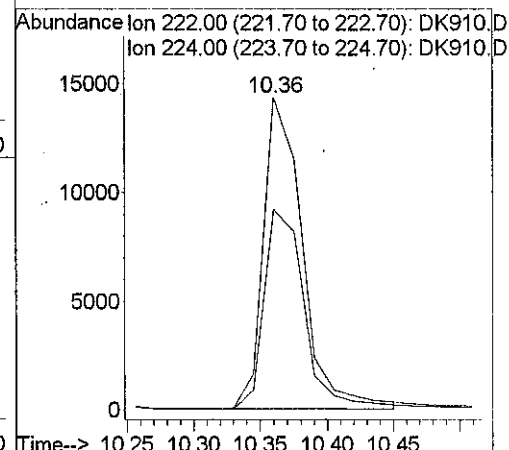
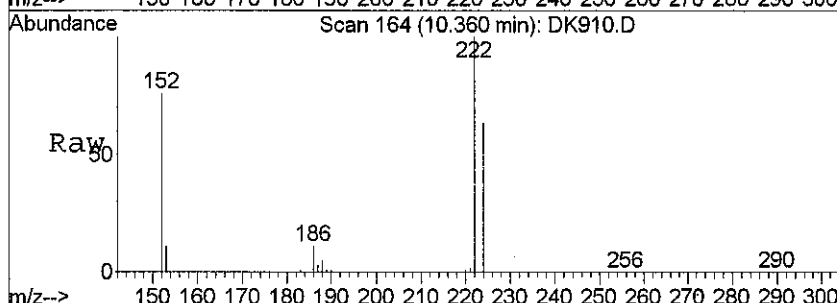
#3  
Total Monochlorobiphenyls  
Concen: 0.11 ppm  
RT: 8.31 min Scan# 27  
Delta R.T. -0.00 min  
Lab File: DK910.D  
Acq: 6 May 2015 11:04 am

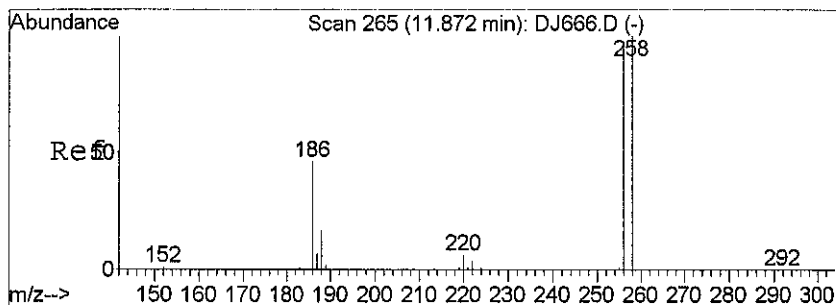
Tgt Ion:188 Resp: 39328  
Ion Ratio Lower Upper  
188 100  
190 29.9 7.7 67.7



#4  
Total Dichlorobiphenyls  
Concen: 0.10 ppm  
RT: 10.36 min Scan# 164  
Delta R.T. -0.00 min  
Lab File: DK910.D  
Acq: 6 May 2015 11:04 am

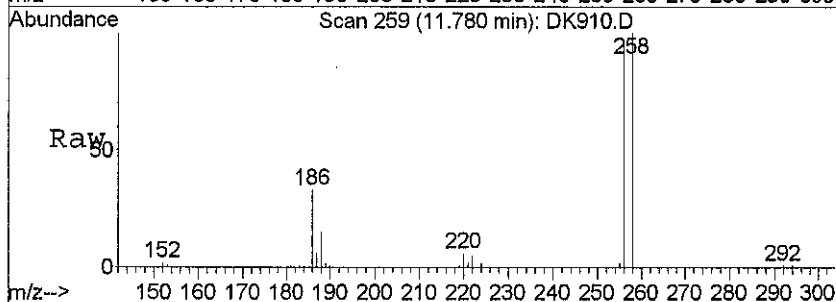
Tgt Ion:222 Resp: 28692  
Ion Ratio Lower Upper  
222 100  
224 64.0 37.9 97.9



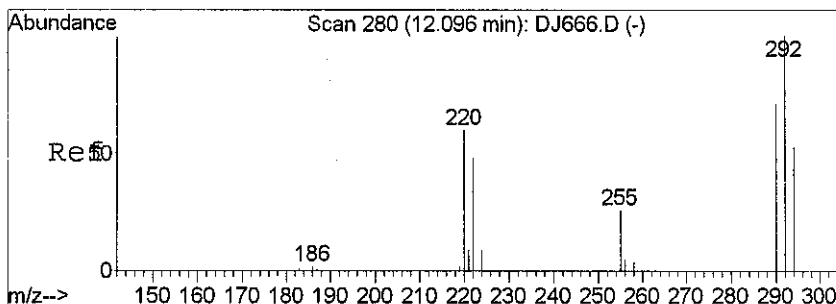
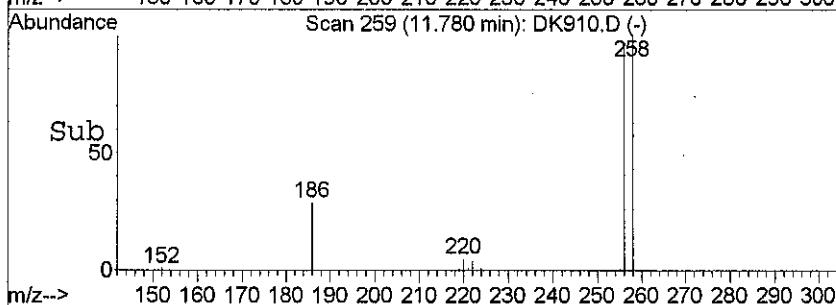
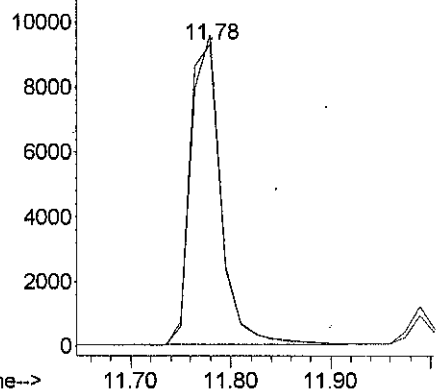


#6  
 Total Trichlorobiphenyls  
 Concen: 0.10 ppm  
 RT: 11.78 min Scan# 259  
 Delta R.T. 0.01 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

Tgt Ion: 256 Resp: 20061  
 Ion Ratio Lower Upper  
 256 100  
 258 103.1 66.5 126.5

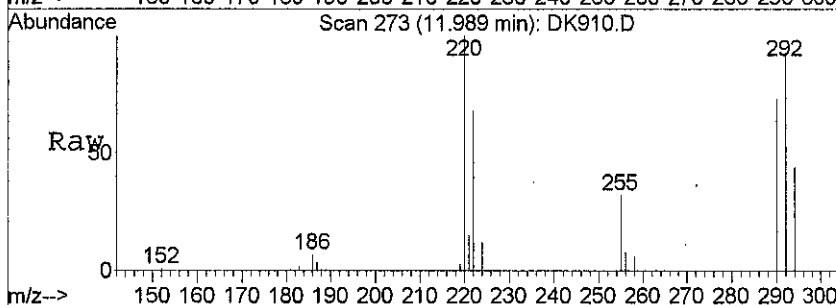


Abundance Ion 256.00 (255.70 to 256.70): DK910.D  
 Ion 258.00 (257.70 to 258.70): DK910.D

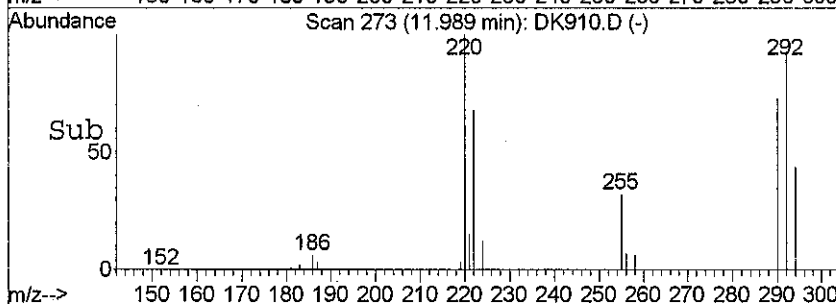
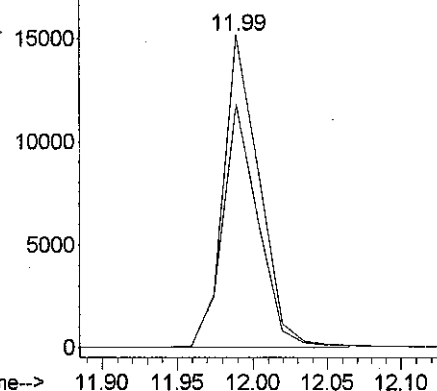


#7  
 Total Tetrachlorobiphenyls  
 Concen: 0.21 ppm  
 RT: 11.99 min Scan# 273  
 Delta R.T. -0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

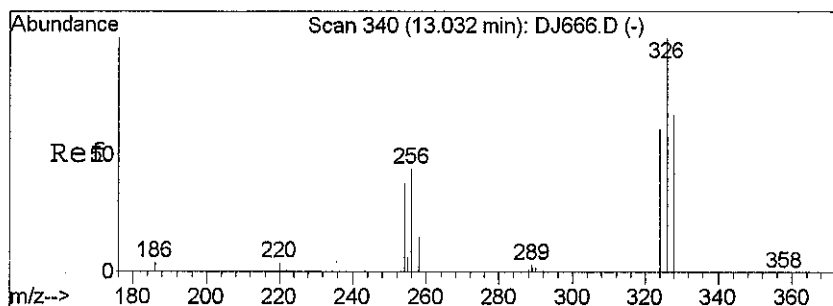
Tgt Ion: 292 Resp: 24660  
 Ion Ratio Lower Upper  
 292 100  
 290 78.0 46.7 106.7



Abundance Ion 292.00 (291.70 to 292.70): DK910.D  
 Ion 290.00 (289.70 to 290.70): DK910.D

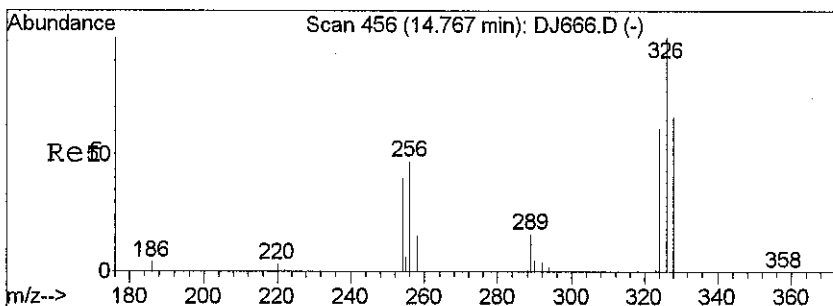
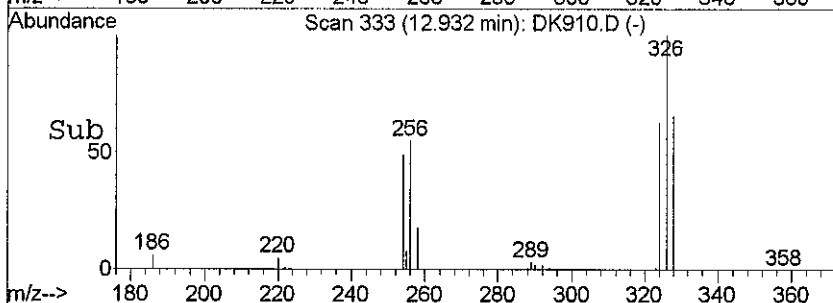
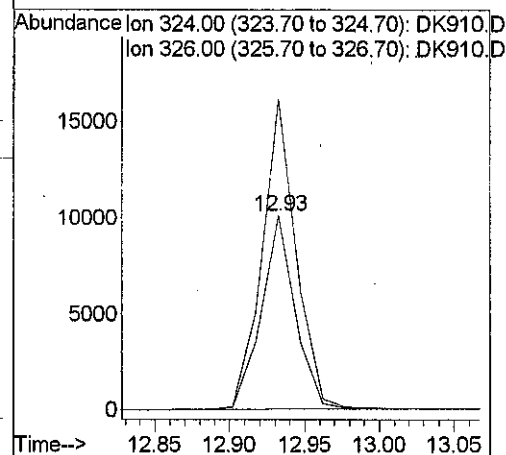
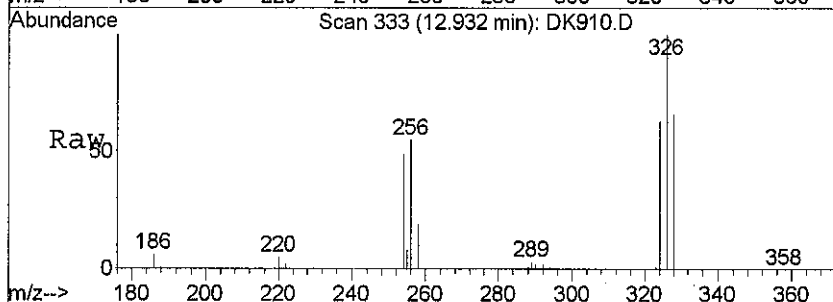






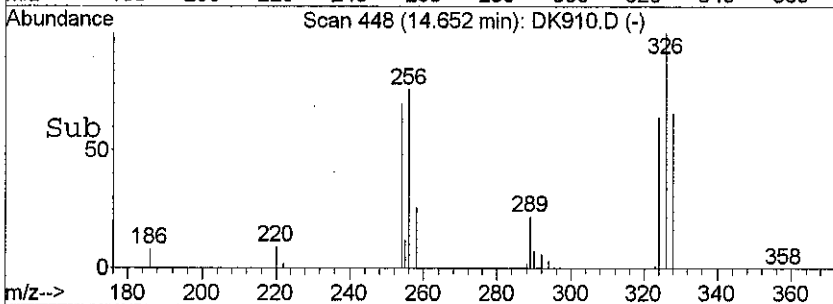
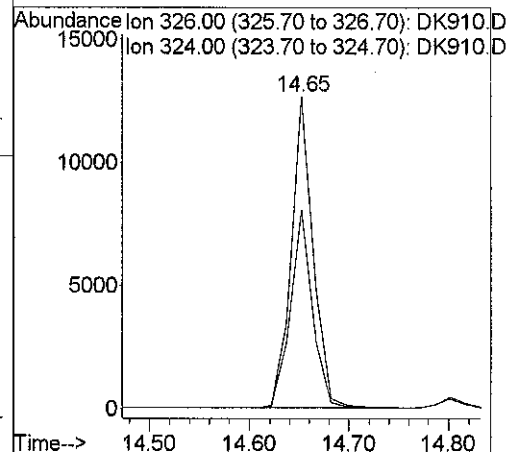
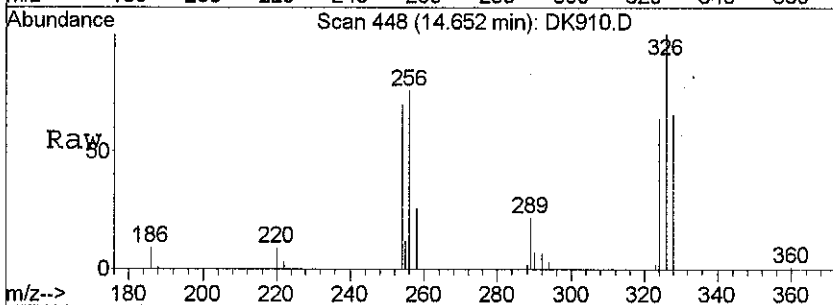
#8  
 RT #104 (CL5)  
 Concen: 0.20 ppm  
 RT: 12.93 min Scan# 333  
 Delta R.T. 0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

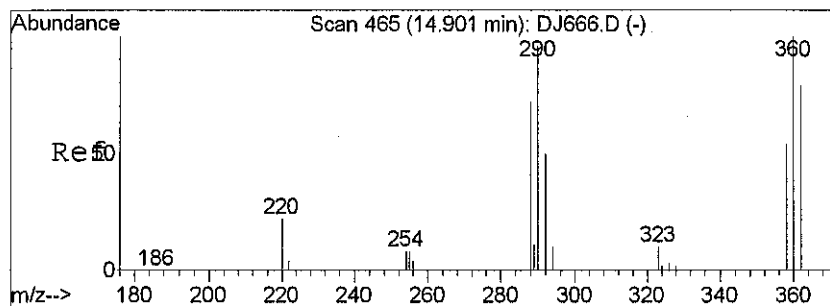
Tgt Ion:324 Resp: 15652  
 Ion Ratio Lower Upper  
 324 100  
 326 160.0 127.6 187.6



#9  
 Total Pentachlorobiphenyls  
 Concen: 0.21 ppm  
 RT: 14.65 min Scan# 448  
 Delta R.T. 0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

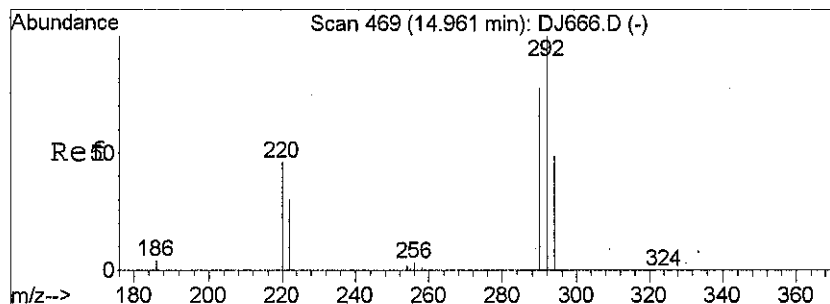
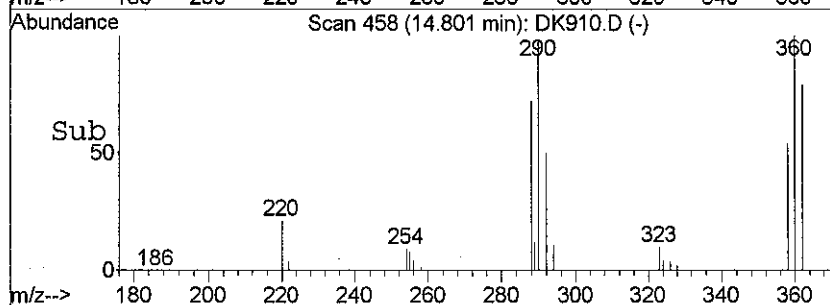
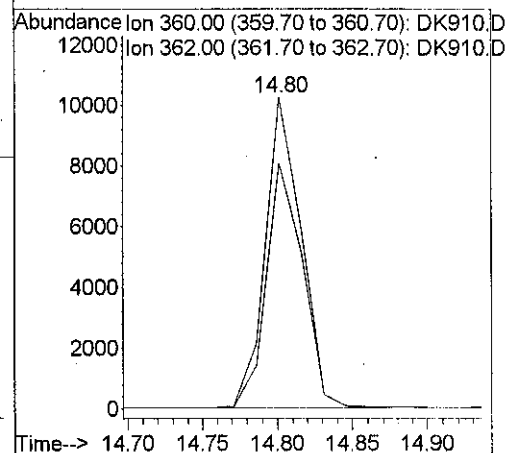
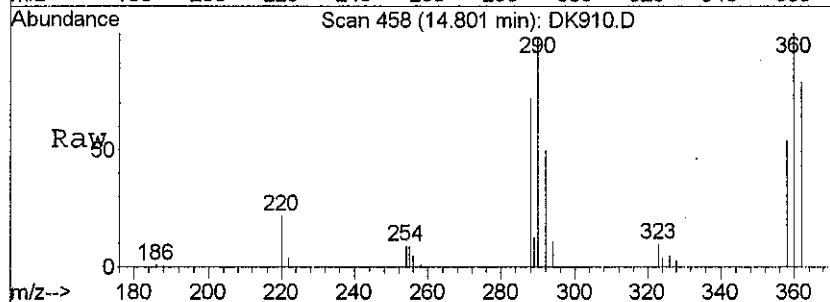
Tgt Ion:326 Resp: 19305  
 Ion Ratio Lower Upper  
 326 100  
 324 63.6 33.4 93.4





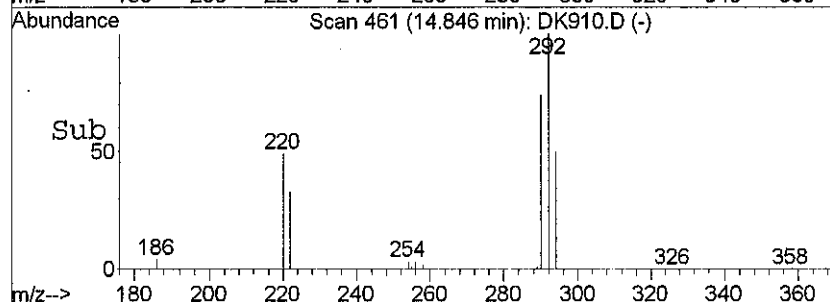
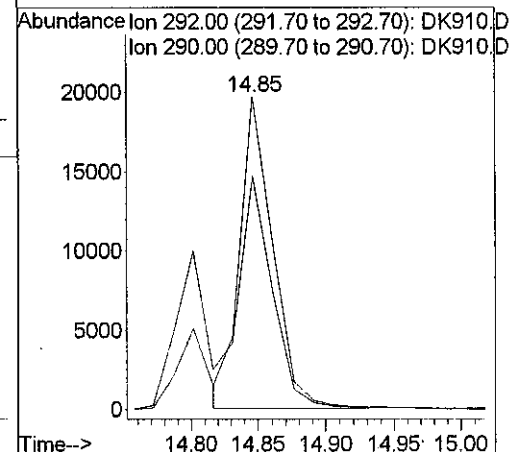
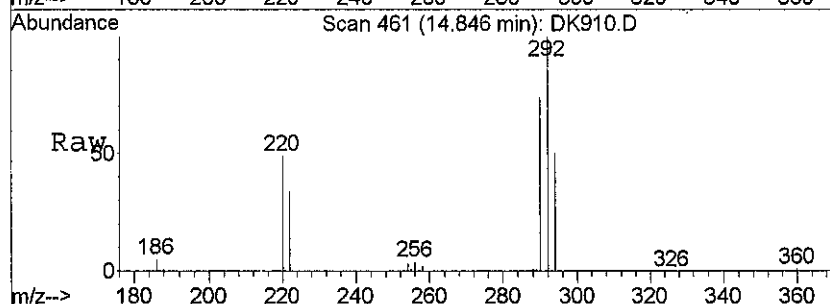
#10  
 Total Hexachlorobiphenyls  
 Concen: 0.21 ppm  
 RT: 14.80 min Scan# 458  
 Delta R.T. 0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

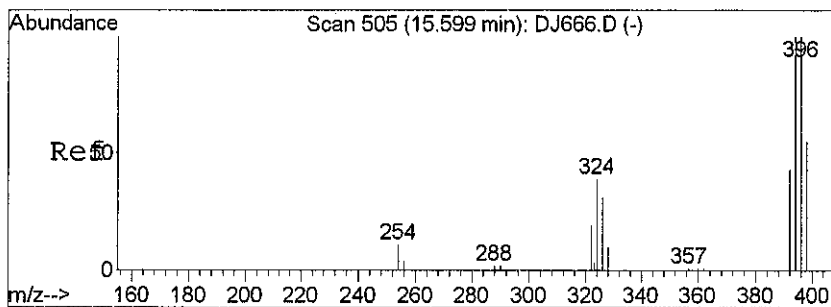
Tgt Ion:360 Resp: 16776  
 Ion Ratio Lower Upper  
 360 100  
 362 78.8 47.7 107.7



#11  
 RT #77 (CL4)  
 Concen: 0.21 ppm m  
 RT: 14.85 min Scan# 461  
 Delta R.T. -0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

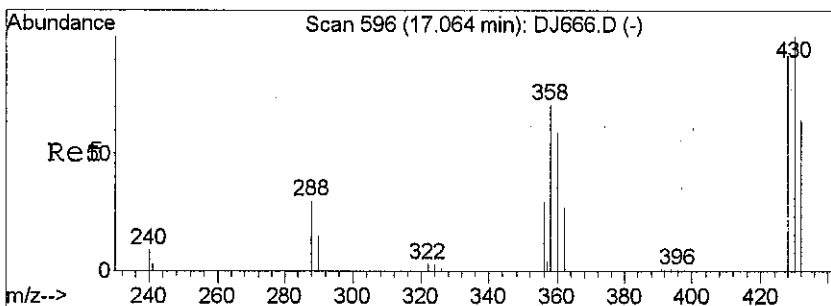
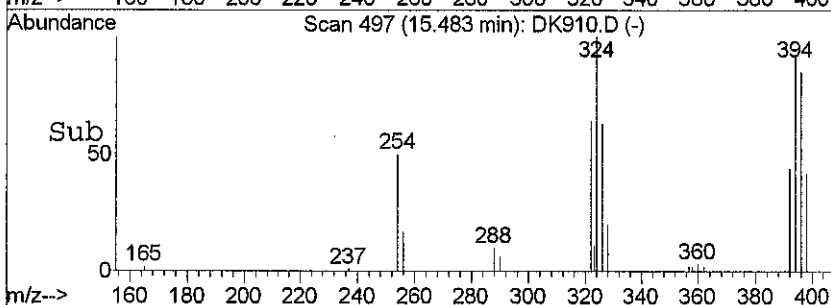
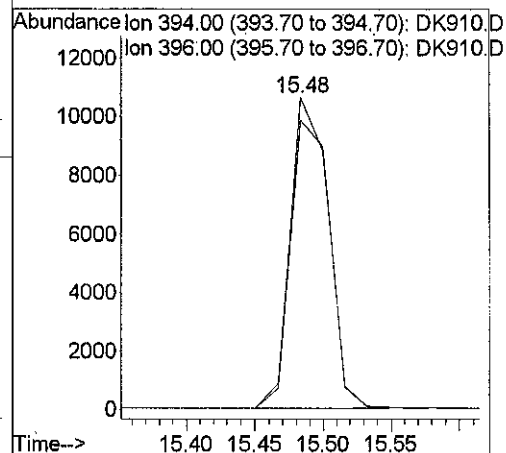
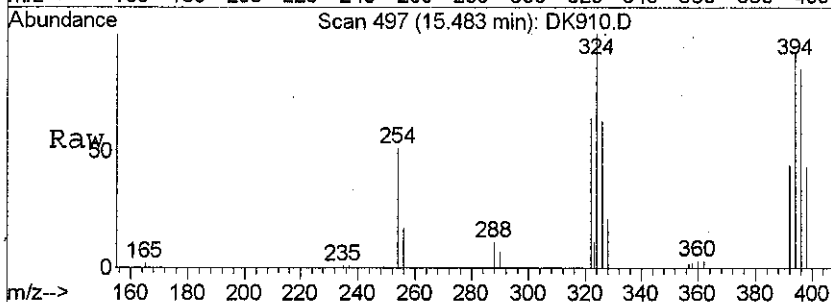
Tgt Ion:292 Resp: 33026  
 Ion Ratio Lower Upper  
 292 100  
 290 74.5 44.5 104.5





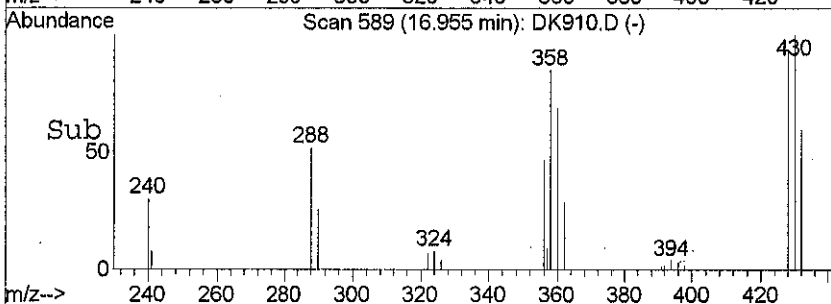
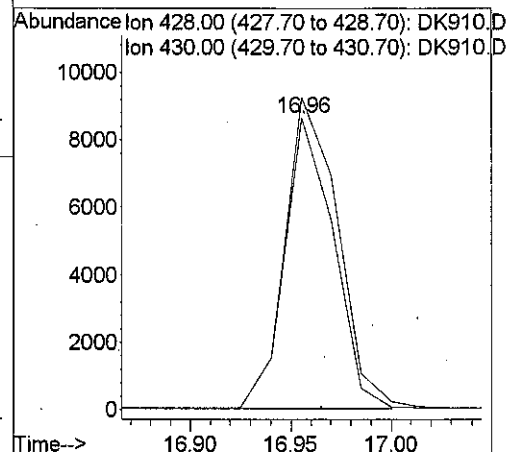
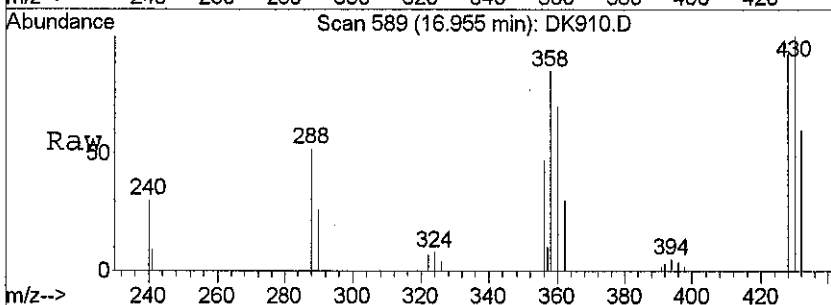
#12  
 Total Heptachlorobiphenyls  
 Concen: 0.30 ppm  
 RT: 15.48 min Scan# 497  
 Delta R.T. -0.01 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

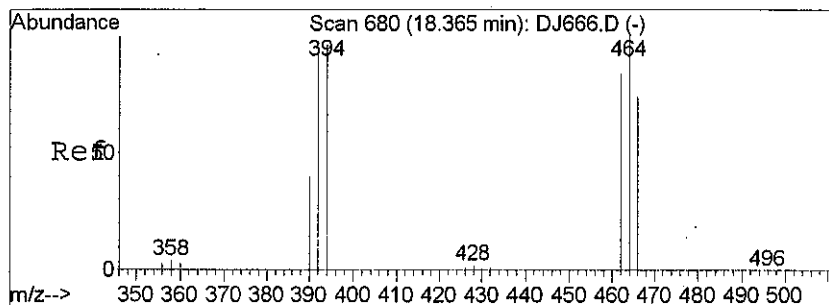
Tgt Ion:394 Resp: 20766  
 Ion Ratio Lower Upper  
 394 100  
 396 92.7 61.1 121.1



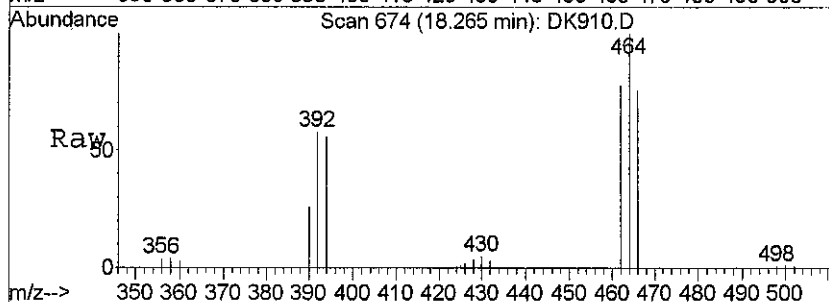
#14  
 Total Octachlorobiphenyls  
 Concen: 0.31 ppm  
 RT: 16.96 min Scan# 589  
 Delta R.T. 0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am

Tgt Ion:428 Resp: 14675  
 Ion Ratio Lower Upper  
 428 100  
 430 105.9 85.0 145.0

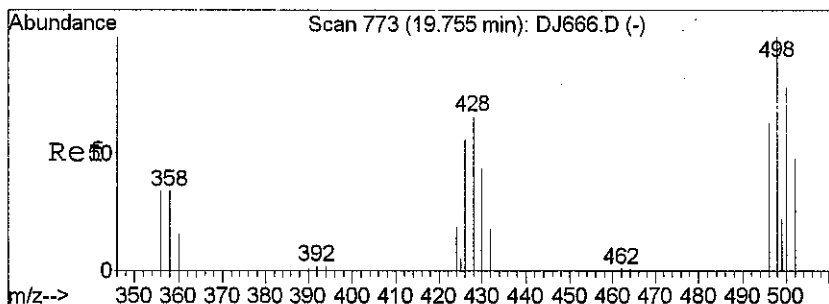
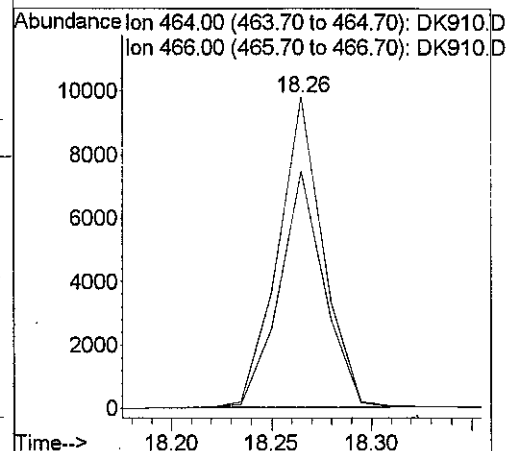
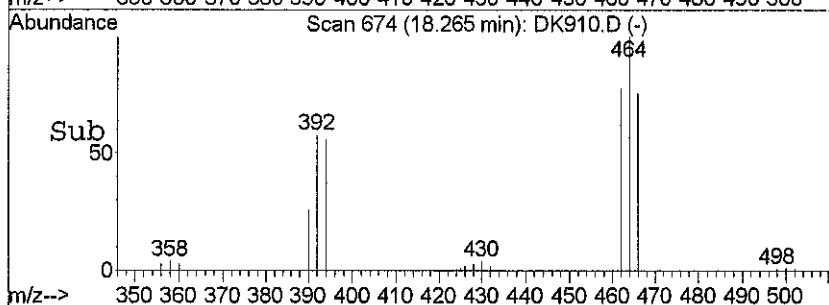




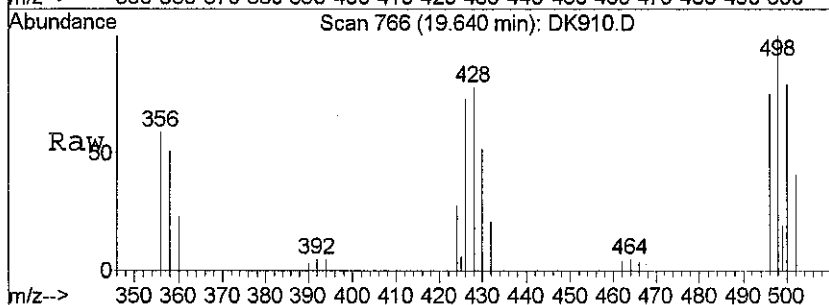
#15  
 Total Nonachlorobiphenyls RT#  
 Concen: 0.43 ppm  
 RT: 18.26 min Scan# 674  
 Delta R.T. -0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am



Tgt Ion:464 Resp: 15306  
 Ion Ratio Lower Upper  
 464 100  
 466 76.3 42.3 102.3



#16  
 Total Decachlorobiphenyl  
 Concen: 0.53 ppm  
 RT: 19.64 min Scan# 766  
 Delta R.T. -0.00 min  
 Lab File: DK910.D  
 Acq: 6 May 2015 11:04 am



Tgt Ion:498 Resp: 14807  
 Ion Ratio Lower Upper  
 498 100  
 500 79.0 44.8 104.8

